ENVIRONMENTAL SERVICES
SPB05-894P-T

1. PARTIES

THIS CONTRACT, is entered into by and between the State of Montana, Department of Administration, State Procurement Bureau, (hereinafter referred to as "the State"), whose address and phone number are Room 165 Mitchell Building, 125 North Roberts, PO Box 200135, Helena MT 59620-0135, (406) 444-2575 and **Kirk Environmental, LLC**, (hereinafter referred to as the "Contractor"), whose nine digit Federal ID Number, address and phone number are 81-0519098, 1100 Waukesha Ave., Suite B3, Helena MT 59601, and (406) 442-9976.

THE PARTIES AGREE AS FOLLOWS:

2. PURPOSE

The purpose of this term contract is to establish a list of Environmental Service Providers in several service areas. All qualified offerors will be assembled into a multiple contractor term contract for use by state agencies and other public procurement units. The State makes no guarantee of use by any agency-authorized access to this term contract. However, through data conveyed by the Montana Department of Environmental Quality, Montana Department of Natural Resources and Conservation, and Montana Fish, Wildlife and Parks, it is anticipated that this term contract should access approximately 2.5 million dollars or more annually.

3. EFFECTIVE DATE, DURATION, AND RENEWAL

3.1 Contract Term. This contract shall take effect upon execution of all signatures, and terminate on June 30, 2007, unless terminated earlier in accordance with the terms of this contract. (Mont. Code Ann. § 18-4-313.)

3.2 Contract Renewal. This contract may, upon mutual agreement between the parties and according to the terms of the existing contract, be renewed in one-year intervals, or any interval that is advantageous to the State, for a period not to exceed a total of four additional years. This renewal is dependent upon legislative appropriations.

3.3 Addition of Analytical Laboratory Contractor. Proposals will be accepted between April 1 and May 1 of each calendar year from current firms requesting review of their qualifications to perform Analytical Laboratory Services as originally requested under RFP SPB05-894P. The state will evaluate each proposal received in the exact manner in which the original proposals for other categories were evaluated. If proposal passes the requirements as evaluated to perform Analytical Lab Services, the state will update that firms term contract to include the Analytical Lab Services

4. NON-EXCLUSIVE CONTRACT

The intent of this contract is to provide state agencies with an expedited means of procuring supplies and/or services. This contract is for the convenience of state agencies and is considered by the State Procurement Bureau to be a "Non-exclusive" use contract. Therefore, agencies may obtain this product/service from sources other than the contract holder(s) as long as they comply with Title 18, MCA, and their delegation agreement. The State Procurement Bureau does not guarantee any usage.

5. COOPERATIVE PURCHASING

Under Montana law, public procurement units, as defined in section 18-4-401, MCA, have the option of cooperatively purchasing with the State of Montana. Public procurement units are defined as local or state public procurement units of this or any other state, including an agency of the United States, or a tribal procurement unit. Unless the bidder/offeror objects, in writing, to the State Procurement Bureau prior to the

award of this contract, the prices, terms, and conditions of this contract will be offered to these public procurement units.

6. TERM CONTRACT REPORTING

Term contract holder(s) shall furnish annual reports of term contract usage. Each report shall contain complete information on all public procurement units utilizing this term contract. Minimum information required to be included in usage reports: name of the agency or governmental entity who contacted you regarding a potential project; project title; agency contact person; if the project was not successfully negotiated, state the reason; number and title of contracts received; total dollar amounts for contracts received; the names of your company personnel involved in the project; and project status as of usage report date. The report for this term contract will be due on July 20th of each year.

Reported volumes and dollar totals may be checked by the State Procurement Bureau against State records for verification. Failure to provide timely or accurate reports is justification for cancellation of the contract and/or justification for removal from consideration for award of contracts by the State.

7. COST/PRICE ADJUSTMENTS

7.1 Cost Increase by Mutual Agreement. After the initial term of the contract, each renewal term may be subject to a cost increase by mutual agreement. Contractor must provide written, verifiable justification for any cost adjustments they request during each renewal period. Contractor shall provide its cost adjustments in both written and electronic format.

7.2 Differing Site Conditions. If, during the term of this contract, circumstances or conditions are materially different than set out in the specifications, the Contractor may be entitled to an equitable adjustment in the contract price. The Contractor shall immediately cease work and notify, in writing, the State of any such conditions necessitating an adjustment as soon as they are suspected and prior to the changed conditions affecting the performance of this contract. Any adjustment shall be agreed upon in writing by both parties to the contract.

7.3 Cost/Price Adjustment. All requests for cost/price adjustment must be submitted between April 1st and April 30th along with written justification. Requests received after April 30th will not be considered unless written approval from the SPB Contracts Officer is given to submit at a later date. In no event will cost/price adjustments be allowed beyond May 15th. All requests that are approved will be incorporated by contract amendment and made effective July 1st of the next approved renewal period.

8. SERVICES AND/OR SUPPLIES

8.1 Service Categories. Contractor agrees to provide to the State the following services:

Water Quality Monitoring – Fixed Station and Probabilistic Design. The statewide monitoring network has three components. The first component is the fixed station water quality-monitoring network. There are 38 fixed station sites located on streams throughout Montana where there are active USGS gauging stations. The USGS is currently contracted to collect all of the water chemistry samples. The State may also collect sediment samples for trace metal analyses. Remote sensing may be used to assess stream geomorphology, flood plain and watershed characteristics.

Water Quality Monitoring - Lakes and Streams. As part of the monitoring program, standards criteria and TMDL development, lakes will continue to be sampled collecting chemistry, physical, and habitat parameters. Stream sampling may include sediment and water chemistry, geomorphology, habitat, or sources of pollutants (e.g., pebble counts, channel cross-section, stream reach assessments, photo points, Rosgen Type II, etc GIS and remote sensing may be used to assess riparian habitats, and watershed physical characteristics.

Water Quality Monitoring - Reference Sites. As part of the monitoring program and standards criteria development, reference sites will continue to be identified and characterized as described above.

TMDL Targets. The TMDL program (within DEQ) will often need additional data in order to develop TMDL targets. Targets are quantitative water quality goals or "endpoints" that represent all the applicable narrative or numeric water quality standards. These targets, when achieved will represent full beneficial use support. This may require additional monitoring to determine reference condition when TMDL targets are based on narrative criteria or designated uses (water quality standards). Targets may be based on numeric water quality criteria, pollutant concentrations or loads, habitat or geomorphic measures, and/or biological criteria or populations. Targets are also used to determine the existing Water Quality Impairment Status (WQIS) of the streams on the 303(d) list. In most cases, the contractor will be required to write a report, which includes a recommendation and justification for one or more TMDL targets and also compare those targets to the existing conditions to determine WQIS. Communication with the State is crucial while deriving preliminary targets to ensure TMDL consistency across Montana. For consideration in this service area, the contractor should also have experience and be accepted for service categories 3.5.4 and 3.5.12-15.

TMDL Source Assessment/Delineation. The TMDL program (within DEQ) will often need additional data in order to link water quality impairments to their sources, or to allocate sources of pollutants. This may require data compilation, investigative monitoring and statistical analysis within a specified watershed, which can be used for source allocation, or the linkage of water quality impairments to causes and sources of impairment (e.g., sediment or land use practices). Quantitative source assessments may be conducted using field-based monitoring and/or interpretation and analysis of aerial photos, digital images, or GIS coverages depending upon impairment sources and available information. In most cases, contractors will be required to write a report that identifies what the major causes of impairment are and where the major sources of pollutants are located. DEQ will also need to have all pollution/pollutant sources quantified. The quantification of these loads will assist in both source load allocations and the total maximum daily loads. In addition, data collected during source assessments must be entered into an approved database structure or format and linkage to the National Hydrography Dataset (NHD) streams layer may be requested. The department may also request a cost/benefit analysis for implementing BMPs, which can be used for developing TMDL source allocations. Communication with the State is crucial while deriving assessing sources of pollutants to ensure TMDL consistency across Montana. For consideration in this service area, the contractor should also have experience and be accepted for service categories 3.5.4, 3.5.6, and 3.5.12-15.

TMDL Load Allocations. The TMDL program (within DEQ) will often need additional data in order to develop load allocations in conjunction with the source assessment/delineation. Load allocations are the portion of a receiving water's loading capacity that is attributed to existing or future point or non-point sources of pollution or to natural background sources. Load allocations are best estimates of the loading, which can range from reasonably accurate estimates to gross allotments. Allocation can be expressed as a percent reduction that results in a maximum allowable load or as performance-based, which demonstrates how BMPs will be applied and how they will reduce the current loads. Communication with the State is crucial while deriving preliminary load allocations to ensure TMDL consistency across Montana. For consideration in this service area, the contractor should also have experience and be accepted for service categories 3.5.4, 3.5.6-7, and 3.5.12-15.

Total Maximum Daily Loads. The TMDL program (within DEQ) will often need additional data in order to develop Total Maximum Daily Loads (TMDLs). A TMDL is defined as the sum of the wasteload allocations to point sources, load allocations to non-point sources and natural background sources with a margin of safety considering seasonal variation. TMDLS can be expresses in terms of mass per time, toxicity, or other appropriate measures that relate to the State's Water Quality Standards. Communication with the State is crucial while deriving preliminary TMDLs to ensure consistency across Montana. For consideration in this service area, the contractor should also have experience and be accepted for service categories 3.5.4, 3.5.6-8, and 3.5.12-15.

Stakeholder Participation. The TMDL program (within DEQ) will often need additional assistance in order to develop implementation/restoration strategies and monitoring plans. These plans often require public involvement with the local stakeholders. These efforts typically results in developing the measures needed to

achieve full beneficial use support or to monitoring the uncertainties that arise during the TMDL process. Offerors should be experienced in or have staff members with proper credentials to facilitate participation with local stakeholders.

TMDL Effectiveness Monitoring. Effectiveness monitoring will be required to evaluate the success of implementing a TMDL plan. Monitoring will often include the collection of some combination of chemical, physical or biological data, which can be used to determine if water quality is improving over time. Most monitoring designs and techniques will be fairly straightforward and may only require visiting a site once per year. In most cases, the contractor will be required to write an annual report, which can be used to determine if water quality is improving.

Geographic Information Systems (GIS) Services. The State, and in particular DEQ, will need assessments that characterize a watershed and identify and quantify all probable sources of pollutants. GIS maps will be required for every waterbody that is assessed. Thematic maps may include, but are not limited to: land ownership, land use, topography, hydrology, soils, precipitation, and/or endangered species distribution. In addition, DEQ may request that GIS applications be used to facilitate the interpretation and analysis of digital images and/or other georeferenced data.

Remote Sensing. The State may consider the use of remote sensing for characterizing a watershed and identifying probable sources of pollutants. For example, indicator metrics may be calculated from an air photo. Metrics may include active channel width, Rosgen level 1 Channel types, % shade, % land use, % land cover, average flood plain width, riparian corridor fragmentation, road density, road crossings, length of irrigation ditch/area, etc. DEQ may request contractors to assist them in developing remote sensing assessment techniques or to employ developed techniques in conducting detailed assessments. All data must be entered into an approved database structure, format, or program and linkage to the National Hydrography Dataset (NHD) streams layer may be requested. If necessary, the Contractor can subcontract in order to acquire the aerial photography products. All subcontractors for this task must be approved by the State prior to initiating a contract.

Water Quality Modeling. The State, and in particular DEQ, uses contracted services in the development and/or application of watershed and water quality modeling tools and techniques in the development of TMDLs. Models may be used to assist in defining TMDL loading allocations, performing existing/potential conditions analysis, watershed scenario analysis, and/or standards attainment analysis. The types of models that may be employed include dynamic watershed loading models (i.e. SWAT, HSPF), water quality fate and transport models (i.e. QUAL2E, QUAL2K), stream temperature and/or shade models (i.e. SSTemp, HeatSource, Shadow), and multi-dimensional lake/reservoir models (i.e. CE QUAL W2). In addition, simpler modeling tools and techniques such as GIS-based Risk Assessment Modeling may be employed or developed based on project needs and resources. The DEQ may also seek assistance in the identification and/or development of simple modeling tools that may be implemented at the desktop that facilitate quick scenario applications. These tools should be able to focus on specific water quality issues such as sediment, nutrients, salinity, etc. and be tailored to the various (eco) regions across the state.

Statistical Analysis. The State may request that large data sets be statistically analyzed for determining trends or for making comparisons. This service area may include data compilation, organization, manipulation and analysis. These analyses may be used to validate environmental targets by comparing reference data to existing data. They may also be used to establish a relationship or linkage between indicators and targets, the estimated loads and how targets link to beneficial use support. Analyses should be appropriate for the type of data being analyzed. In many cases, the contractor will be responsible for determining and providing rationale for appropriate statistical analyses to address pre-formulated environmental hypotheses. Analyses must consider spatial and temporal variations. Analyses may range from providing simple descriptive statistics to reporting multifactor predictive analyses.

DEQ Electronic Data / Information Technical Assistance. The DEQ needs to be able to easily transmit water quality data into the modernized STORET database and make it more accessible to data consumers and the public. To accomplish this, the DEQ seeks to obtain technical products, services, and support, as needed, to migrate datasets to production database system(s) and improve data flow and data

quality from a variety of sources into STORET. These tasks may include, but are not limited to solutions in commonly available software products to generate data that conforms to STORET and Oracle database requirements. Specific service areas sought include, but are not limited to: technical support for data conversion, reformatting, and/or normalization of existing historic and transformed datasets; automated data validation routines or procedures designed to support specific data quality objectives; technical solutions for data entry, data capture, and data reporting, maintenance, upgrades or enhancements to existing software interfaces; technical support in the implementation of STORET; acquisition of STORET-compatible data deliverables.

Heavy Equipment Operators. The State and other governmental entities utilize the services of Heavy Equipment Operators to implement environmental projects throughout Montana. Heavy Equipment Operators are encouraged to submit a proposal to allow for easy access for implementation of projects by various governmental entities. Contractors do not have to possess the equipment, but when submitting a proposal, they must incorporate the cost of equipment rental, mobilization and demobilization. The State does anticipate several firms to respond to this service area and we are therefore allowing offerors to designate the parts of the state in which they will be available for work. The attached forms for Heavy Equipment Costs and Location must be completed and incorporated into the proposal.

Revegetation Services. Revegetation Specialists are utilized by the State and other governmental entities to enhance and complete environmental project tasks. The services offered by Revegetation Specialists are planning, designing, implementation along with providing of supplies, materials and equipment necessary to carryout the tasks. If a firm does not have the staff or equipment to implant a project, they must then be able to demonstrate a plan for delivery of product and implementation of a project through subcontracting or professional cooperative agreements.

Watershed Coordination. Within the State of Montana, there are over 50 active watershed groups that are comprised of local stakeholders working together for the efficient use and preservation of the natural resources. The watershed groups typically work with State and Federal agencies to complete agreed upon tasks. The funding for the activities is usually in the form of State and Federal grant funds in which the group must apply and compete for the awards. Therefore, the watershed groups either designate or hire a professional coordinator to research and secure funds, organize public meetings, facilitate the public meetings, represent the group at local, regional, state and even national conferences. The offeror's in this service area must make sure that they will not have a conflict of interest. The coordinator and/or their firm cannot compete for any projects or activities under the jurisdiction of the watershed group.

Communication/Educational Services – Information & Education. Communication/education contractor specializing in information and education would assist in implementing the statewide information and education program for designated environmental projects. An example would be for the non-point sources of pollution as defined in the federal Clean Water Act. Some potential activities related to the aforementioned example are: hydromodification, stormwater runoff, raising livestock, farming, logging, land disposal, construction, historic mining districts, atmospheric deposition, transportation, and habitat modification. The Information and Education services would be targeted towards specific projects develop by the State or governmental entities.

Communication/Educational Services – Contract Administration. Communication/education contractor specializing in contract administration would assist in tracking contract progress, accounting systems for the contracts, documenting and tracking match funds, developing scopes of work for project contracts, soliciting for project sponsors, conducting the procurement process for the contractor selection, tracks contracts progress, obstacles and fund availability, reviews and evaluates products resulting from contracts as to meeting contractual requirements, inputting information into database to track contact and assemble detailed contract information with ease.

Communication/Education Services – Information Transfer & TMDL Technical Editing. Communication/education contractor specializing in information transfer would assist in the design, production and distribution of information for target audiences via TV, radio, or print media. These projects often require the conversion of complex water quality data into information the public can understand. Products include

pamphlets, brochures, guidebooks, and videos; maintaining a webpage, writing press releases; set up public meetings, give interviews, make presentations at workshops and conferences and organize conferences and set up field trips. Offerors in this field may also specify their ability to provide Technical Editing of Natural Science documents, in particular Total Maximum Daily Load documents. Technical editing can include, but is not limited to proofreading for grammar and mathematical errors, document clarity, and linkage between different sections.

Land Use Planning Services. Land use planning services would include Agricultural Land Use, Watershed Land Use or any other land planning services to benefit the state or other governmental entity. The Land Use Planning efforts can include soil analysis, crop recommendations, and irrigation recommendations to assist in developing a beneficial plan for the land in question.

Preparation of Technical Manuals or Circulars. Regulatory programs require periodic preparation of technical materials to guide either public regulated entities or in-house staff in how to work through a regulatory requirement such as obtaining or writing a permit. These products require technical writing, document preparation, preparation of figures or tables, preparation and use of spreadsheets, research and assimilation of regulations, technical approaches to problem solving and explanation of approaches to prepare applications and/or actual permits.

8.2 Reuse of Documents. When the projects dictate a design or engineered approach, the State agrees that it will not apply the Contractor's designs to any other projects.

9. ENGINEERING ACCESS

All of the firms selected may need to have access to engineering services depending on the nature of the project. The contractor(s) will be expected to use their own best judgment as to whether engineering services are needed for a given project. However, traditional engineering methodologies are not the emphasis of this RFP. It is a violation of State Statute to practice engineering or land surveying without a license.

10. PROJECT SELECTION

10.1 Project Identification. The State will be responsible for identifying projects, contacting landowners and securing necessary permission/cooperation agreements, selecting a contractor, writing grant applications and approving project payments.

10.2 Hazardous Materials. The State will not initiate projects where it is known that hazardous materials are present. If there is an indication of a potential of hazardous materials, then the State will do testing prior to contacting the contractor. However, there is always the possibility of unforeseen problems resulting in the stoppage of a project.

10.3 Meetings. The selected contractor may be required to meet with State personnel at the project site to conduct a site evaluation, discuss project issues and begin the negotiation process on project feasibility, conceptual design and costs for each project.

10.4 Approach Expectations. In the case of restoration activities, the agency will identify the preferred techniques. The determination made by the State may define which contractor(s) are contacted for project initiation. The State is always open to new and innovative approaches that accomplish project goals.

11. SELECTING A CONTRACTOR

The State may select a term contract holder from the Environmental Services contract home page as provided under the state's website address http://www.discoveringmontana.com/doa/gsd/procurement/TermContracts/environservices/Default.asp, taking into consideration such things as the contractor's area of expertise, requirements and location of the project, the contractor's availability and access to resources necessary to efficiently and effectively complete the

project, demonstrated excellent past performance on State and public projects, identified subcontractors and total project cost.

General. Ordering agencies shall use the procedures in this section when ordering services priced at hourly rates as established by each Term Contract (TC). The applicable service categories are identified in each TC along with the contractor's price lists.

Request for Quotation (RFQ) procedures. The ordering agency must provide an RFQ, which includes the statement of work and limited, but specific evaluation criteria (*e.g.*, experience and past performance), to TC contractors that offer services that will meet the agency's needs. The RFQ may be posted to the agency's state website to expedite responses.

Statement of Work (SOWs). All SOW's shall include at a minimum a detailed description of the work to be performed, location of work, period of performance, deliverable schedule, applicable performance standards and any special requirements (e.g., security clearances, travel, special knowledge).

(1) Ordering agency may select a contractor from the appropriate service category and directly negotiate a mutually acceptable project based on a sudden and unexpected happening or unforeseen occurrence or condition, which requires immediate action. (Exigency).

(2) Ordering agency may place orders at or below the $5,000 threshold with any TC contractor that can meet the agency's needs. The ordering agency should attempt to distribute orders among all service category contractors.

(3) For orders estimated to exceed $5,000 but less than $25,000.

(i) The ordering agency shall develop a statement of work.
(ii) The ordering agency shall provide the RFQ (including the statement of work and evaluation criteria) to at least three TC contractors that offer services that will meet the agency's needs.
(iii) The ordering agency shall request that contractors submit firm-fixed prices to perform the services identified in the statement of work.

(4) For orders estimated to exceed $25,000. In addition to meeting the requirements of (3) above, the ordering agency shall:

(i) Provide the RFQ (including the statement of work and the evaluation criteria) to a minimum of six service category TC contractors (if category has less than 6, all contractors will be offered an RFQ) with a 50% replacement factor for each subsequent request for quote in the same service category.

Evaluation. The ordering agency shall evaluate all responses received using the evaluation criteria provided in the RFQ to each TC contractor. The ordering agency is responsible for considering the level of effort and the mix of labor proposed to perform a specific task being ordered, and for determining that the total price is reasonable. The agency will place the order with the contractor that represents the best value. After award, ordering agencies will provide timely notification to unsuccessful TC contractors. If an unsuccessful TC contractor requests information on a task order award that was based on factors other than price alone, a brief explanation of the basis for the award decision shall be provided.

Minimum documentation. The ordering agency shall document:
(1) The TC contractors considered, noting the contractor from which the service was purchased.
(2) A description of the service purchased.
(3) The amount paid.
(4) The evaluation methodology used in selecting the contractor to receive the order.
(5) The rationale for making the selection.
(6) Determination of price fair and reasonableness.

Agency project task orders will be utilized to finalize the project. Only written addenda will be used for adjustments of the task orders and must be signed by both parties. All task orders must contain signatures from both parties and appropriate agency legal review as directed in their procurement policy.

The State will monitor contractor selection by using the information provided in the annual TC usage reports.

Contractor's who fail to respond to three RFQ opportunities within a one-year period between July 1st and June 30th may be removed from the qualified list of contractors.

12. CONTRACTOR RESPONSIBILITIES

12.1 Supervision and Implementation. The selected contractor for an individual project will be responsible for the supervision and implementation of the approach and will be responsible for oversight of work performed by all subcontractors. In most cases the contractor will provide and be responsible for all the necessary equipment, materials, supplies and personnel necessary for proper execution of the work. However, the State reserves the right to hire subcontractors (equipment and/or labor) if it will provide a cost savings to the State. The selected contractor will also be responsible for clean up of the sites if necessary and must have the sites inspected by the State immediately prior to completion.

12.2 On-Site Requirements. When a contractor is contacted by the State to discuss a project, the State and the contractor may visit the job site if deemed necessary by the Project Manager, to become familiar with conditions relating to the project and the labor requirements. The State will provide a detailed scope of work for the project and request the contractor supply the State with a response to project approach, cost, timeframe and any other information deemed necessary by the State to make a selection or complete a contract negotiation.

In the cases of Restoration or On-The-Ground Activities, the contractor shall adequately protect the work, adjacent property, and the public in all phases of the work. They shall be responsible for all damages or injury due to their action or neglect.

The contractor shall maintain access to all phases of the contract pending inspection by the State, the landowner, or their representative. All interim or final products funded by the contract will become the property of the State or Cooperative Purchaser upon payment for said products.

All work rejected as unsatisfactory shall be corrected prior to final inspection and acceptance. The contractor shall respond within seven calendar days after notice of observed defects has been given and shall proceed to immediately remedy these defects. Should the contractor fail to respond to the notice or not remedy the defects, the State may have the work corrected at the expense of the contractor.

12.3 Clean Up (when project tasks require). The contractor shall:

- Keep the premises free from debris and accumulation of waste;
- Clean up any oil or fuel spills;
- Keep machinery clean and free of weeds;
- Remove all construction equipment, tools and excess materials; and
- Perform finishing site preparation to limit the spread of noxious weeds before final payment by the State.

12.4 Applicable Laws. The contractor shall keep informed of, and shall comply with all applicable laws, ordinances, rules, regulations and orders of the City, County, State, Federal or public bodies having jurisdiction affecting any work to be done to provide the services required. The contractor shall provide all necessary safeguards for safety and protection, as set forth by the United States Department of Labor, Occupational Safety and Health Administration.

12.5 Cooperation. The contractor shall work closely with the States analytical consultants, (i.e. environmental laboratories and taxonomists) to develop the desired products.

12.6 Work Acceptance. The contractor is responsible for project oversight as needed. The State may also periodically provide personnel for administrative oversight from the initiation of the contract through project completion. All work will be inspected by the State or designated liaison prior to approval of any contract payments. All work rejected as unsatisfactory shall be corrected prior to final inspection and acceptance. Contractor shall respond within seven calendar days after notice of defects has been given by the State and proceed to immediately remedy all defects.

12.7 Records. The contractor will supply the State with documentation, when requested, of methods used throughout project implementation. Contractor will maintain records for themselves and all subcontractors of supplies, materials, equipment and labor hours expended.

12.8 Communication. Remoteness of project sites may necessitate that the contractor have some form of field communication such as a cellular phone. This communication is necessary to enable the State to respond to public concerns related to the project, accidents, inspections, or other project issues that require immediate feedback. In addition, the State or Cooperative Purchaser may require scheduled communication at agreed upon intervals. The communication schedule will be dependent upon the project circumstances and requirements of the contracting agency. In the case when a communication schedule is included in the Scope of Work, the schedule will commence when the contractor initiates the project.

12.9 Change Of Staffing. Since qualifications of personnel were key in determining which offerors were selected to be on this TC, a written notification of any changes in key personnel must be made to the state agency, prior to entering into negotiations to perform any specific work scope. Contractor shall replace such employee(s) at its own expense with an employee of substantially equal abilities and qualifications without additional cost to the agency. If these staffing changes cause the contractor to no longer meet the qualifications stated herein, that firm will be removed from the service area of this TC. Failure to notify the state agency of staffing changes could result in the contractor being removed from the TC listing and possible suspension from bidding on other state projects.

12.10 Collaboration. The State encourages collaboration between contractors to increase the scope of services offered. In cases where the chosen contractor is not able to provide all services needed for the project, the State will expect the chosen contractor to contact other contractors on this list to negotiate subcontracts for these services before going elsewhere. Exceptions to this strategy will be evaluated on a case-by-case basis.

12.11 Subcontractors, Project Budget and Invoicing. All subcontractors to be used in any project must be approved by the authorized entity initiating the project. Project budgets will be negotiated for each individual project contract. However, all rates, terms and conditions set forth in this term contract will be applied to individual contracts. Subcontractor is defined as anyone other than the prime contractor having substantial direct involvement in a specific project.

The State reserves the right to choose the invoicing method from the following:

- Prime contractor's billing will include the subcontractors charges and payment will be made to the prime, or
- Prime and subcontractors will bill the State separately and the State will pay each directly.

13. CONSIDERATION/PAYMENT

13.1 Payment Schedule. In consideration for the services to be provided, the State shall pay according to the negotiated agreement for each project. Hourly rates and miscellaneous charges as provided in Attachment B shall apply.

13.2 Withholding of Payment. The State may withhold payments to the Contractor if the Contractor has not performed in accordance with this contract. Such withholding cannot be greater than the additional costs to the State caused by the lack of performance.

14. CONTRACTOR REGISTRATION

The Contractor will be registered with the Department of Labor and Industry under sections 39-9-201 and 39-9-204, MCA, *prior* to contract execution. The State cannot execute a contract for construction to a Contractor who is not registered. (Mont. Code Ann. § 39-9-401.)

Aquatic Design & Construction Inc. Contractor Registration Number: 51779

15. CONTRACTOR WITHHOLDING

Section 15-50-206, MCA, requires the state agency or department for whom a public works construction contract over $5,000 is being performed, to withhold 1 percent of all payments and to transmit such monies to the Department of Revenue.

16. MONTANA PREVAILING WAGE REQUIREMENTS

Unless superseded by federal law, Montana law requires that contractors and subcontractors give preference to the employment of Montana residents for any public works contract in excess of $25,000 for construction or nonconstruction services in accordance with sections 18-2-401 through 18-2-432, MCA, and all administrative rules adopted pursuant thereto. Unless superseded by federal law, at least 50% of the workers of each contractor engaged in construction services must be performed by bona fide Montana residents. The Commissioner of the Montana Department of Labor and Industry has established the resident requirements in accordance with sections 18-2-403 and 18-2-409, MCA. Any and all questions concerning prevailing wage and Montana resident issues should be directed to the Montana Department of Labor and Industry.

In addition, unless superseded by federal law, all employees working on a public works contract shall be paid prevailing wage rates in accordance with sections 18-2-401 through 18-2-432, MCA, and all administrative rules adopted pursuant thereto. Montana law requires that all public works contracts, as defined in section 18-2-401, MCA, in which the total cost of the contract is in excess of $25,000, contain a provision stating for each job classification the standard prevailing wage rate, including fringe benefits, travel, per diem, and zone pay that the contractors, subcontractors, and employers shall pay during the public works contract.

Furthermore, section 18-2-406, MCA, requires that all contractors, subcontractors, and employers who are performing work or providing services under a public works contract post in a prominent and accessible site on the project staging area or work area, no later than the first day of work and continuing for the entire duration of the contract, a legible statement of all wages and fringe benefits to be paid to the employees in compliance with section 18-2-423, MCA. Section 18-2-423, MCA, requires that employees receiving an hourly wage must be paid on a weekly basis.

Each contractor, subcontractor, and employer must maintain payroll records in a manner readily capable of being certified for submission under section 18-2-423, MCA, for not less than three years after the contractor's, subcontractor's, or employer's completion of work on the public works contract.

The nature of the work performed or services provided under this contract meets the statutory definition of a "public works contract" under section 18-2-401(11)(a), MCA, and falls under the category of Heavy Construction and Nonconstruction services. The booklets containing Montana's 2003 Rates for Nonconstruction Services **and 2004 Rates for Heavy Construction** are attached.

The most current Montana Prevailing Wage Booklet will automatically be incorporated at time of renewal. It is the contractor's responsibility to ensure they are using the most current prevailing wages during performance of its covered work.

17. ACCESS AND RETENTION OF RECORDS

17.1 Access to Records. The Contractor agrees to provide the State, Legislative Auditor or their authorized agents access to any records necessary to determine contract compliance. (Mont. Code Ann. § 18-1-118.)

17.2 Retention Period. The Contractor agrees to create and retain records supporting the environmental services for a period of three years after either the completion date of this contract or the conclusion of any claim, litigation or exception relating to this contract taken by the State of Montana or a third party.

18. ASSIGNMENT, TRANSFER AND SUBCONTRACTING

The Contractor shall not assign, transfer or subcontract any portion of this contract without the express written consent of the State. (Mont. Code Ann. § 18-4-141.) The Contractor shall be responsible to the State for the acts and omissions of all subcontractors or agents and of persons directly or indirectly employed by such subcontractors, and for the acts and omissions of persons employed directly by the Contractor. No contractual relationships exist between any subcontractor and the State.

19. HOLD HARMLESS/INDEMNIFICATION

The Contractor agrees to protect, defend, and save the State, its elected and appointed officials, agents, and employees, while acting within the scope of their duties as such, harmless from and against all claims, demands, causes of action of any kind or character, including the cost of defense thereof, arising in favor of the Contractor's employees or third parties on account of bodily or personal injuries, death, or damage to property arising out of services performed or omissions of services or in any way resulting from the acts or omissions of the Contractor and/or its agents, employees, representatives, assigns, subcontractors, except the sole negligence of the State, under this agreement.

20. REQUIRED INSURANCE

20.1 General Requirements. The Contractor shall maintain for the duration of the contract, at its cost and expense, insurance against claims for injuries to persons or damages to property, including contractual liability, which may arise from or in connection with the performance of the work by the Contractor, agents, employees, representatives, assigns, or subcontractors. This insurance shall cover such claims as may be caused by any negligent act or omission.

20.2 Primary Insurance. The Contractor's insurance coverage shall be primary insurance as respect to the State, its officers, officials, employees, and volunteers and shall apply separately to each project or location. Any insurance or self-insurance maintained by the State, its officers, officials, employees or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

20.3 Specific Requirements for Commercial General Liability. The Contractor shall purchase and maintain occurrence coverage with combined single limits for bodily injury, personal injury, and property damage of $1,000,000 per occurrence and $2,000,000 aggregate per year to cover such claims as may be caused by any act, omission, or negligence of the Contractor or its officers, agents, representatives, assigns or subcontractors.

20.4 Additional Insured Status. The State, its officers, officials, employees, and volunteers are to be covered and listed as additional insureds; for liability arising out of activities performed by or on behalf of the Contractor, including the insured's general supervision of the Contractor; products and completed operations; premises owned, leased, occupied, or used.

20.5 Specific Requirements for Automobile Liability. The Contractor shall purchase and maintain coverage with split limits of $500,000 per person (personal injury), $1,000,000 per accident occurrence (personal injury), and $100,000 per accident occurrence (property damage), OR combined single limits of

$1,000,000 per occurrence to cover such claims as may be caused by any act, omission, or negligence of the contractor or its officers, agents, representatives, assigns or subcontractors.

20.6 Additional Insured Status. The State, its officers, officials, employees, and volunteers are to be covered and listed as additional insureds for automobiles leased, hired, or borrowed by the Contractor.

20.7 Specific Requirements for Professional Liability. The Contractor shall purchase and maintain occurrence coverage with combined single limits for each wrongful act of $1,000,000 per occurrence and $2,000,000 aggregate per year to cover such claims as may be caused by any act, omission, negligence of the Contractor or its officers, agents, representatives, assigns or subcontractors. Note: if "occurrence" coverage is unavailable or cost prohibitive, the Contractor may provide "claims made" coverage provided the following conditions are met: (1) the commencement date of the contract must not fall outside the effective date of insurance coverage and it will be the retroactive date for insurance coverage in future years; and (2) the claims made policy must have a three year tail for claims that are made (filed) after the cancellation or expiration date of the policy.

20.8 Deductibles and Self-Insured Retentions. Any deductible or self-insured retention must be declared to and approved by the state agency. At the request of the agency either: (1) the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the State, its officers, officials, employees, or volunteers; or (2) at the expense of the Contractor, the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claims administration, and defense expenses.

20.9 Certificate of Insurance/Endorsements. A certificate of insurance from an insurer with a Best's rating of no less than A- indicating compliance with the required coverages, has been received by the State Procurement Bureau, PO Box 200135, Helena MT 59620-0135. The Contractor must notify the State immediately, of any material change in insurance coverage, such as changes in limits, coverages, change in status of policy, etc. The State reserves the right to require complete copies of insurance policies at all times.

21. COMPLIANCE WITH THE WORKERS' COMPENSATION ACT

Contractors are required to comply with the provisions of the Montana Workers' Compensation Act while performing work for the State of Montana in accordance with sections 39-71-120, 39-71-401, and 39-71-405, MCA. Proof of compliance must be in the form of workers' compensation insurance, an independent contractor's exemption, or documentation of corporate officer status. Neither the contractor nor its employees are employees of the State. This insurance/exemption must be valid for the entire term of the contract. A renewal document must be sent to the State Procurement Bureau, PO Box 200135, Helena MT 59620-0135, upon expiration.

22. COMPLIANCE WITH LAWS

The Contractor must, in performance of work under this contract, fully comply with all applicable federal, state, or local laws, rules and regulations, including the Montana Human Rights Act, the Civil Rights Act of 1964, the Age Discrimination Act of 1975, the Americans with Disabilities Act of 1990, and Section 504 of the Rehabilitation Act of 1973. Any subletting or subcontracting by the Contractor subjects subcontractors to the same provision. In accordance with section 49-3-207, MCA, the Contractor agrees that the hiring of persons to perform the contract will be made on the basis of merit and qualifications and there will be no discrimination based upon race, color, religion, creed, political ideas, sex, age, marital status, physical or mental disability, or national origin by the persons performing the contract.

23. INTELLECTUAL PROPERTY

All patent and other legal rights in or to inventions created in whole or in part under this contract must be available to the State for royalty-free and nonexclusive licensing. Both parties shall have a royalty-free, nonexclusive, and irrevocable right to reproduce, publish or otherwise use and authorize others to use, copyrightable property created under this contract.

24. PATENT AND COPYRIGHT PROTECTION

24.1 Third Party Claim. In the event of any claim by any third party against the State that the products furnished under this contract infringe upon or violate any patent or copyright, the State shall promptly notify Contractor. Contractor shall defend such claim, in the State's name or its own name, as appropriate, but at Contractor's expense. Contractor will indemnify the State against all costs, damages and attorney's fees that accrue as a result of such claim. If the State reasonably concludes that its interests are not being properly protected, or if principles of governmental or public law are involved, it may enter any action.

24.2 Product Subject of Claim. If any product furnished is likely to or does become the subject of a claim of infringement of a patent or copyright, then Contractor may, at its option, procure for the State the right to continue using the alleged infringing product, or modify the product so that it becomes non-infringing. If none of the above options can be accomplished, or if the use of such product by the State shall be prevented by injunction, the State will determine if the Contract has been breached.

25. CONTRACT TERMINATION

25.1 Termination for Cause. The State may, by written notice to the Contractor, terminate this contract in whole or in part at any time the Contractor fails to perform this contract.

25.2 Reduction of Funding. The State, at its sole discretion, may terminate or reduce the scope of this contract if available funding is reduced for any reason. (See Mont. Code Ann. § 18-4-313(3).)

26. STATE PERSONNEL

26.1 State Contract Manager. The State Contract Manager identified below is the State's single point of contact and will perform all contract management pursuant to section 2-17-512, MCA, on behalf of the State. Written notices, requests, complaints or any other issues regarding the contract should be directed to the State Contract Manager.

The State Contract Manager for this contract is:

Robert Oliver, Contracts Officer
Room 165 Mitchell Building
125 North Roberts
PO Box 200135
Helena MT 59620-0135
Telephone #: (406) 444-0110
Fax #: (406) 444-2529
E-mail: roliver@mt.gov

26.2 State Project Manager. Each using State agency or Cooperative Purchaser will identify a Project Manager in the project task order. The Project Manager will manage the day-to-day project activities on behalf of the State/Cooperative Purchaser.

27. CONTRACTOR PERSONNEL

27.1 Change Of Staffing. Since qualifications of personnel was key in determining which offerors were selected to be on this term contract list, a written notification to the State Procurement Bureau of any changes of key personnel must be made within two weeks of the change. These change notifications will be completed upon the departure or hiring of key personnel who are professional employees critical to awarded service areas. If these staffing changes cause the firm to no longer meet the qualifications stated herein, that firm will be removed from the service area of this term contract. Failure to notify the State Procurement Bureau of staffing changes could result in the contractor being removed from the term contract listing and possible suspension from bidding on other State projects.

27.2 Contractor Contract Manager. The Contractor Contract Manager identified below will be the single point of contact to the State Contract Manager and will assume responsibility for the coordination of all contract issues under this contract. The Contractor Contract Manager will meet with the State Contract Manager and/or others necessary to resolve any conflicts, disagreements, or other contract issues.

The Contractor Contract Manager for this contract is:

Steve MacNeill
1100 Waukesha Ave Suite B3
Helena MT 59601
Telephone #: (406) 442-9976
Fax #: (406) 442-2179
E-mail: kirkenv1@msn.com

27.3 Contractor Project Manager. The Contractor Project Manager identified below will manage the day-to-day project activities on behalf of the Contractor:

The Contractor Project Manager for this contract is:

Steve MacNeill
1100 Waukesha Ave Suite B3
Helena MT 59601
Telephone #: (406) 442-9976
Fax #: (406) 442-2179
E-mail: kirkenv1@msn.com

28. MEETINGS

The Contractor is required to meet with the State's personnel, or designated representatives, to resolve technical or contractual problems that may occur during the term of the contract or to discuss the progress made by Contractor and the State in the performance of their respective obligations, at no additional cost to the State. Meetings will occur as problems arise and will be coordinated by the State. The Contractor will be given a minimum of three full working days notice of meeting date, time, and location. Face-to-face meetings are desired. However, at the Contractor's option and expense, a conference call meeting may be substituted. Consistent failure to participate in problem resolution meetings two consecutive missed or rescheduled meetings, or to make a good faith effort to resolve problems, may result in termination of the contract.

29. CONTRACTOR PERFORMANCE ASSESSMENTS

The State may do assessments of the Contractor's performance. This contract may be terminated for one or more poor performance assessments. Contractors will have the opportunity to respond to poor performance assessments. The State will make any final decision to terminate this contract based on the assessment and any related information, the Contractor's response and the severity of any negative performance assessment. The Contractor will be notified with a justification of contract termination. Performance assessments may be considered in future solicitations.

30. TRANSITION ASSISTANCE

If this contract is not renewed at the end of this term, or is terminated prior to the completion of a project, or if the work on a project is terminated, for any reason, the Contractor must provide for a reasonable period of time after the expiration or termination of this project or contract, all reasonable transition assistance requested by the State, to allow for the expired or terminated portion of the services to continue without interruption or adverse effect, and to facilitate the orderly transfer of such services to the State or its designees. Such transition assistance will be deemed by the parties to be governed by the terms and conditions of this contract, except for those terms or conditions that do not reasonably apply to such transition assistance. The State shall pay the Contractor for any resources utilized in performing such transition assistance at the most current rates

provided by the contract. If there are no established contract rates, then the rate shall be mutually agreed upon. If the State terminates a project or this contract for cause, then the State will be entitled to offset the cost of paying the Contractor for the additional resources the Contractor utilized in providing transition assistance with any damages the State may have otherwise accrued as a result of said termination.

31. CHOICE OF LAW AND VENUE

This contract is governed by the laws of Montana. The parties agree that any litigation concerning this bid, proposal or subsequent contract must be brought in the First Judicial District in and for the County of Lewis and Clark, State of Montana and each party shall pay its own costs and attorney fees. (See Mont. Code Ann. § 18-1-401.)

32. SCOPE, AMENDMENT AND INTERPRETATION

32.1 Contract. This contract consists of 12 numbered pages, any Attachments as required, RFP # SPB05-894P**,** as amended and the Contractor's RFP response as amended. In the case of dispute or ambiguity about the minimum levels of performance by the Contractor the order of precedence of document interpretation is in the same order.

32.2 Entire Agreement. These documents contain the entire agreement of the parties. Any enlargement, alteration or modification requires a written amendment signed by both parties.

33. EXECUTION

The parties through their authorized agents have executed this contract on the dates set out below.

DEPARTMENT OF ADMINISTRATION
STATE PROCUREMENT BUREAU
PO BOX 200135
HELENA MT 59620-0135

BY:_____
Penny Moon, Contracts Officer

BY:_____
(Signature)

DATE:_____

KIRK ENVIRONMENTAL, LLC
1100 WAUKESHA AVE., SUITE B3
HELENA MT 59601
FEDERAL ID # 81-0519098

BY:_____
(Name/Title)

BY:_____
(Signature)

DATE:_____

3.0 STAFF QUALIFICATIONS (30 PERCENT)

Presented in this section are the qualifications of the professional staff. Table 3 (provided at the end of this section) summarizes the 20-member team qualifications. Rates for each person named in the table can be found in the Section 5 Cost Proposal.

The success of any project is driven by the team's most important resource: people who are qualified, responsive, experienced, and committed to the project at hand. KirK has carefully selected a team of water resources professionals to provide water quality monitoring, TMDL support services, construction / revegetation, and watershed support services requested in the RFP. The general organization of our team is illustrated in Figure 1 of Section 2. Lead technical and principle staff are described below with brief biographical summaries. A list of all lead and project support staff and their education and years of experience are in Table 3, along with detailed information in their resumes (Appendix A). All of the proposed service areas solicited (as shown in Table 1) are represented in Table 3, with the appropriate technical lead or project support staff.

Steve MacNeill - KirK Environmental, LLC
Project Manager and Water Quality Monitoring
Mr. MacNeill will serve as the project manager on this contract and will draw from his more than 18 years of experience performing and managing environmental investigations. He has excellent verbal and written communication skills. His ability to pay attention to detail makes him an excellent project manager involving multiple task orders. Mr. MacNeill is also the contract lead for monitoring services. Mr. MacNeill will work closely with Scott Payne and Randy Huffsmith on technical planning, client meetings and interaction, and contract management. Past responsibilities include both the fieldwork and management aspects of water quality, soils, surface water and groundwater resources, reservoir rehabilitation, upland vegetation and wetlands related projects. Technical writing that Mr. MacNeill has worked on during his career include TMDL reporting and development, phase I and phase II environmental site assessments (ESA), underground storage tank (UST) investigations, remedial investigations (RI), feasibility studies (FS), site inspections (SI), and preliminary assessments (PA). He has prepared work plans, quality assurance project plans (QAPP), watershed assessment plans, and soil and groundwater sampling plans and has served as the primary author on numerous environmental documents. His fieldwork experience includes soil and vegetation characterization and wetlands delineation, chemical, physical and biological assessment of impacted surface water bodies, geophysical investigations, environmental sample collection, UST removals, and installation of groundwater monitoring and water production wells. Mr. MacNeill has also provided detailed document review services for CERCLA and RCRA documents and has served as a senior quality control reviewer for over twelve years.

Mr. MacNeill's technical experience includes participation in, or management of, numerous TMDL assessment and planning efforts throughout Montana and two reservoir rehabilitation study projects. Watershed assessment/planning efforts in the Flathead Basin include the Stillwater River, Ashley Creek, Whitefish River, Whitefish Lake and Flathead Lake. Mr. MacNeill has also provided management and assessment and planning support services on nine tributaries to the Upper Clark Fork River as part of the East Valley Watershed Project (Deer Lodge), and has also participated in assessment activities on Gold Creek and Browns Gulch, the Ruby River, the Beaverhead River, and the Boulder River. Additionally, Mr. MacNeill is currently participating in Montana reservoir rehabilitation assessment activities on Douglas Creek.

Mr. MacNeill also compiled the Voluntary Nutrient Reduction Strategy (VNRS) Implementation Plan for the Flathead Basin that outlines the strategies to reduce non-point nutrient sources to Flathead Lake in order to improve lake water quality. Included within the plan are projects designed to address surface water, groundwater and air sources of nitrogen and phosphorus and an education component to introduce new best management practices (BMPs) and stewardship opportunities,

Lastly, Mr. MacNeill is the KirK Quality Assurance / Quality Control officer. Mr. MacNeill holds this position to make sure client satisfaction is obtained on each and every KirK project in terms of schedule, budget, and deliverable expectations. Mr. MacNeill understands that the buck stops in his position for ultimate client satisfaction.

Randy Huffsmith, P.E., D.E.E. - KirK Environmental, LLC
Technical Oversight and Planning - Engineering Lead, Point Sources, & TMDLs
Mr. Huffsmith has over 18 years of experience on environmental and engineering projects, and will serve as the engineering principle on this contract for technical oversight and planning for each task order. He will review all task orders, negotiate and sign documents and coordinate staff for projects in coordination with Mr. MacNeill. As a company principal, Mr. Huffsmith has direct access to KirK resources and as an engineer is well versed on the construction side of plans and specifications, construction oversight, and procurement. He will work directly with Mr. MacNeill for ensuring that our clients will receive timely, cost-effective, and innovative services. Mr. Huffsmith has significant experience working on point sources, and is the contract lead for point source technical needs. Lastly, Mr. Huffsmith is a water resource engineer and will provide land use planning services related to irrigated land and water management in watersheds.

Mr. Huffsmith served as the project manager for comprehensive TMDL services as part of the Flathead Basin Landscape/Environmental Engineering Services contact for the Flathead Basin Commission. He has managed numerous projects and prepared engineering designs for numerous hazardous waste and water resources projects. In addition, he has been actively involved with Resource Conservation and Recovery Act (RCRA) and CERCLA sites in Montana since 1988 and is currently the company officer for several DEQ projects. Mr. Huffsmith has been actively involved in all facets of water resource investigations and has completed complex erosion and sediment control models for numerous sites in Montana and Wyoming. Mr. Huffsmith has been a design engineer and provided construction oversight services for DEQ and Montana EPA projects with construction values in excess of 10 million dollars. He has also conducted remedial design/remedial action activities in Montana for private clients, DEQ, EPA, Montana Department of Military Affairs, U.S. Forest Service, and Montana Power Company. Mr. Huffsmith is fully committed to ensuring clients receive excellent contractor services.

Lastly, Mr. Huffsmith is committed to ensuring client satisfaction on each and every KirK project in terms of schedule, budget, and deliverable expectations. Mr. Huffsmith will work directly with Mr. MacNeill and the client to ensure all technical aspects and engineering planning are properly completed and supported for this contact.

Scott Payne, R.G. -KirK Environmental, LLC
Technical Oversight and Planning - Earth Sciences Lead, Nonpoint Sources, & TMDL
Mr. Payne has more than 18 years of experience as a professional hydrogeologist, environmental consultant, and group facilitator, and will serve as the earth sciences principle on this contract for technical oversight and planning for each task order. He will also serve as the contract lead for TMDL support services (targets, source assessment, load allocation, TMDL determination, stakeholder participation, and effectiveness monitoring). He has extensive on-the-ground watershed assessment and planning experience, preparation of restoration and conservation plans, experience setting up complex monitoring sampling and analysis plans using the EPA Data Quality Objective approach (DQO) and TMDL preparation and development. He has also served as a manager on many projects, and has excellent communication skills. Lastly, Mr. Payne has significant experience working on nonpoint source water pollution issues and is the contract lead for nonpoint source technical needs.

Mr. Payne has extensive experience evaluating/monitoring physical and chemical conditions associated with surface water, groundwater and aquifer systems, interpreting surface and groundwater chemistry, and evaluating potential groundwater supplies for industry and municipalities. He has served multiple times as an expert on water rights and water law and has conducted both analytical and numerical groundwater flow and solute transport modeling. Other experience includes expert witness and litigation support for Superfund projects, remediating contaminated soil through land farming and soil vapor extraction; evaluating water treatment and disposal systems; overseeing activities completed at CERCLA sites and RCRA facilities; and conducting document reviews. Mr. Payne has installed over 200 monitoring wells and is the author of

numerous environmental documents, work plans, papers, and reports. Since 1992, Mr. Payne has focused his career on accelerating investigation and cleanup of contaminated and impaired sites to efficiently and effectively protect human health and the environment, reduce risk, and reduce the overall cost of cleaning up sites. Mr. Payne is the author of Strategies for Accelerating Cleanup at Toxic Waste Sites published by CRC Press and marketed internationally.

Lastly, Mr. Payne is committed to ensuring client satisfaction on each and every KirK project in terms of schedule, budget, and deliverable expectations. Mr. Payne will work directly with Mr. MacNeill and the client to ensure all technical aspects and watershed / TMDL planning are properly completed and supported under this contact.

Phil Peterson - Stillwater Sciences
TMDL Development and Water Quality Modeling Oversight
Mr. Peterson brings over 25 years of experience for the development, evaluation, and management of natural resource projects, and has recently joined the staff of Stillwater Sciences. KirK is excited and pleased to have Mr. Peterson involved as the contract co-leader for Water Quality Modeling and TMDL develop support. As a high-level fishery biologist, Mr. Peterson also brings technical expertise valuable for all aspects of this project. Mr. Peterson will be co-leader for the work completed by Stillwater Sciences staff providing water quality modeling, statistical analysis, and GIS support services. Mr. Peterson's career in Washington has spanned both sides of the state from the temperate rainforest of the Olympic Peninsula to the steppe shrub of the Columbia Basin. Mr. Peterson is well versed in stream ecology of salmonids in western Washington as well having conducted field research for the University of Washington on the intra-gravel environment and reproductive behavior of chum salmon and winter survival of juvenile coho. Mr. Peterson was most recently responsible for aquatic and riparian habitat conservation practices on 420,000 acres of industrial forestland in Washington and Oregon. He conducted and supervised stream and riparian related research and monitoring projects. As part of this effort, Mr. Peterson led the development and writing of a 50-year Habitat Conservation Plan (HCP) for 31 aquatic and 20 terrestrial species. This HCP is also being used as the implementing agreement for an ownership wide Total Maximum Daily Load ("TMDL") for temperature and sediment, combining for the first time under a single set of prescriptions, requirements of the Endangered Species Act and the Clean Water Act.

Steve Ralph - Stillwater Sciences
TMDL Development and Water Quality Modeling Oversight
Mr. Ralph has over 25 years of experience in natural resource management in Washington State and has recently joined Stillwater Sciences. KirK is excited and pleased to have Mr. Ralph involved as the contract co-leader for Water Quality Modeling and TMDL development. As a senior fishery biologist, Mr. Ralph brings technical expertise valuable for all aspects of this project. Mr. Ralph will be co-leader for the work completed by Stillwater Sciences staff providing water quality modeling, statistical analysis, and GIS support services. Concentrating on freshwater and marine ecosystems, most of this experience was gained working for various federal, state, tribal, city and county governments engaged in resolving environmental management decisions. Mr. Ralph has been involved in preparation and critique of environmental exhibits for FERC hydropower licensing, numerous in-stream flow studies and subsequent negotiation of flow regimes. He worked extensively in review of federal, state and private forestry practices, and refinement of the regulatory schemes in pursuit of appropriate protection of habitats for native salmon and trout. Mr. Ralph has developed considerable experience in limiting factors analyses and development of comprehensive monitoring programs for assessment of instream aquatic habitats, including experience in methods, evaluation and interpretation of monitoring data. Mr. Ralph participated on the salmon technical recovery teams for the Stillaguamish and Snohomish basin working groups developing both a watershed assessment and identification of priorities for restoration actions.

Most recently, Mr. Ralph worked for the Environmental Protection Agency to focus efforts and policy development to more directly affect salmon conservation and restoration efforts, under the National Environmental Policy Act, Endangered Species Act and the Clean Water Act. His responsibilities at the EPA included providing technical and policy support within the EPA, and working with sister federal agencies on development of regional salmon policies, habitat protection and restoration, water quality standards, TMDL's

and habitat conservation plans. Mr. Ralph has co-authored numerous publications regarding aquatic habitat protection, watershed restoration and broad-scale monitoring design.

Noah Hume, Ph.D. - Stillwater Sciences
Water Quality Modeling
Originally trained in ocean engineering, Dr. Hume has over 15 years experience in aquatic ecology and engineering spanning water quality, water supply and treatment, and water quality modeling. Dr. Hume will be the Stillwater Sciences technical point person for computer modeling and will work directly with Steve Ralph and Phil Peterson of Stillwater Sciences on sediment and temperature modeling, as well as agency support staff working on TMDL development. Dr. Hume will direct support team staff to complete modeling efforts to ensure field monitoring data collected support modeling efforts and the model selection, set up, and simulation process represent the most efficient and effective modeling approach to meet project goals. Dr. Hume's areas of expertise include fisheries biology, limnology, wetlands ecology and water quality management. Dr. Hume is an experienced project manager and has provided technical experience on a wide variety of interdisciplinary projects, including computer modeling, habitat assessments, created wetland projects, river restoration and fisheries programs, and a number of engineering design projects.

Peter Baker, Ph.D. - Stillwater Sciences
Water Quality Modeling and Statistical Analysis
Dr. Baker has over 14 years experience and is an experienced modeler and statistician. Dr. Baker will work with Noah Hume supporting the water quality modeling service area, and he will also lead the project statistical analysis service area. Dr. Baker's career has spanned a wide variety of professional services, and especially in modeling and statistical analysis making him a key support person for this contact. For example, he was responsible for maintenance and continued development of the EACH simulation model for San Joaquin chinook salmon populations since 1989, and has developed or assisted in the development of numerous other models for populations of salmonid fishes in California and Montana. He has developed individual-based models of spawning habitat usage by salmonid fishes. As part of the New Don Pedro Project relicensing efforts, he has extended PHABSIM modeling of chinook salmon habitat in the Tuolumne River to include water temperature considerations.

David Zajanc - Stillwater Sciences
Statistical Analysis
As a statistical analyst/fisheries biologist, Mr. Zajanc is currently involved in projects ranging from biological evaluations of hydroelectric projects to statistical analysis of fisheries data. Mr. Zajanc will serve as the technical support for statistical analysis on this contact. Mr. Zajanc's past experience includes work on the Trinity River, for the Hoopa Valley Tribe, as the lead fisheries biologist of their Habitat Division, and research on the residence of juvenile Chinook salmon in the Smith River estuary, California.

Todd Hoitsma - Hoitsma Ecological Inc.
Remote Sensing and Revegetation Services
Mr. Hoitsma will be the contract lead for remote sensing and revegetation services. He also will provide support services under the monitoring service areas for watershed physical assessment, stream corridor, and support for identifying reference reaches. With over 14 years of professional experience, Mr. Hoitsma is an expert on native plant revegetation, riparian and wetland ecology, and geomorphology, and watershed / stream corridor remote sensing. Over the past 10 years, he has been responsible for implementing innovative riparian/wetland revegetation techniques, managing stream restoration projects, and contributing to peer-reviewed "current base science" stream restoration publications for the Washington State Department of Fish and Wildlife. Mr. Hoitsma is currently working as a liaison between EPA enforcement staff and a large Wyoming ranch to restore damage associated with Section 404 violations. His work experience spans several Montana based environmental consulting firms and nonprofit organizations before starting his own business. More recently, Mr. Hoitsma completed the Jefferson River Riparian Inventory in 2003 which covered 42 miles and involved mapping riparian health, physical features, riparian habitat classification, Rosgen channel classification, and comparing historic channel conditions to present day.

Nick Hoyrup
Watershed Coordination
Mr. Hoyrup is the contract lead on watershed coordination services on this contract and also will assist watershed communication/education, technical manuals, and field support services. Mr. Hoyrup's career spans over thirty years as a mineral-processing engineer. The last three years, Mr. Hoyrup has worked alone in a semi-retired capacity as a consultant. He sought the coordinator position in the Beaverhead Watershed for two reasons. First he wanted to try something new and therefore challenging and second the part-time, local nature of the position was a good fit with other obligations. He has held the coordinator position for almost a year now and funding and project activity for the Beaverhead Watershed Committee is now at an all-time high. During his corporate career, he was exposed to, and at times supervised the environmental function as part of his duties. Additionally, he managed projects large and small across North America with both fiscal and functional responsibility. Mr. Hoyrup has performed as a team leader, member, and resource/advisor as needed. Mr. Hoyrup has excellent communication skills and is well versed at working with disparate groups and interests on a watershed scale.

Ann Schwend - Second Nature Landscape and Design, Inc.
Construction, Revegetation, and Land Use Planning
Ann Schwend and her husband Ron Schwend own Second Nature Landscape and Design, Inc. of Twin Bridges and specialize in natural resource construction services for fishery, wetlands, stream corridor, and riparian restoration work. Ann is a land rehabilitation expert and her husband has a degree in engineering making their construction unique in terms of their ability to link natural resource issues, environmental needs and goals to construction projects. Ms. Schwend will serve as the primary contact for the contract support services for revegetation and land use planning, and will be the co-contract lead for construction services and permitting, along with Mr. Schwend.

GIS Support and DEQ Electronic Data / Information Technical Assistance
GIS support staff includes two staff members from KirK and at least two and up to five staff members from Stillwater Sciences. Ian Magruder of KirK will be the contract lead for GIS services and will work directly with Brandy Moses of KirK for preparing project deliverables. Ian will also work with the Stillwater Sciences support staff members including Carl Bolstad and Rafael Real De Asua on GIS applications related to water quality and basin scale modeling / TMDL development. Additional help will be available from Bill Sears, Sayaka Araki, and Douglas Allen of Stillwater Sciences (resumes available upon request). This impressive group of professionals is a true benefit to the KirK team and agency staff for their ability to attribute field data to mapping needs, develop efficient and effective means of depicting chemical, physical, and biologic data, and provide data in DEQ's electronic format.

Biological Assessment
Biological assessment and interpretation support staff include Wease Bollman of Rhithron Associates and Dr. Loren Bahls of Hannaea. The KirK field staff is well versed at collecting both benthic macroinvertibrates and periphyton samples per MDEQ protocols, and they will collect the biologic samples for these support staff. Also on the project team are fishery biologist Steve Ralph and Phil Peterson who will serve as the project fishery experts on this contract, as well as other Stillwater Sciences staff.

Field and Monitoring Support Staff
Field and monitoring support staff include all six KirK staff, Todd Hoitsma of Hoitsma Ecological, Ann Schwend of Second Nature Landscape and Design, Inc., and Nick Hoyrup. Stillwater Sciences staff may also be used if additional field support is needed. Steve MacNeill will lead this service area and apply his many years of monitoring to address fixed station, lakes and stream, and reference site monitoring. The project team all have natural resource, earth science or engineering degrees, yet the hourly rates are economical, meaning the quality of field support data collection will met or exceed all expectations.

Watershed Support Staff
Watershed support staff members include Nick Hoyrup and Scott Payne, Rick Tilstra and Brandy Moses of KirK. The proposed staff members are versed in watershed coordination, communication / education, outreach, administration, and technical writing, and have experience with multiple Montana watersheds groups.

TABLE 3. STAFF QUALIFICATIONS

Staff	Degrees	Years of Experience	Service Matrix Support
1. Steve MacNeill **KirK Environmental, LLC** *Project Manager*	**B.S. Soil and Water Science**, UC Davis, 1985	18 years	Project management all 22 services solicited and technical lead water quality monitoring service areas.
2. Scott Payne, R.G. **KirK Environmental, LLC** *Technical oversight and Planning*	**B.S. Earth Science,** Northland College, 1986 **M.S. Hydrogeology,** University of Montana, 1989 **Ph.D. Candidate** Hydrogeology and Watershed Management, University of Montana.	18 years	Project support for monitoring and lead for nonpoint source assessment, TMDL targets, source assessments, setting TMDLs, load allocation, stakeholder participation, and effectiveness monitoring. Project support for watershed coordination, education, and technical writing.
3. Randy Huffsmith, P.E., D.E.E. **KirK Environmental, LLC** *Technical oversight and Planning*	**B.S. Agricultural Engineering**, University of Wyoming, 1986 **M.S. Water Resource and Agricultural Engineering**, University of Wyoming, 1988	18 years	Lead point source assessment, TMDL targets, source assessments, setting TMDLs, load allocation, stakeholder participation, and effectiveness monitoring. Project support for construction services and land use planning.
4. Ian Magruder **KirK Environmental, LLC** *Technical Lead*	**B.S. Hydrology and Hydrogeology**, University of Montana, 2001 **M.S. *(in progress)* Hydrology and Hydrogeology**, University of Montana	4 years	Project support field work and TMDL development and lead for GIS and MDEQ electronic data formatting.
5. Rick Tilstra **KirK Environmental, LLC** *Project support*	**B.S. Agronomy/Plant and Soil Science**, Montana State University, 1985	12 years	Project support field work and watershed coordination.

Staff	Degrees	Years of Experience	Service Matrix Support
6. Brandy Moses KirK Environmental, LLC *Project support*	**B.S. Environmental Biology**, Stanford University, 2001	3 years	Project support GIS, monitoring, stakeholder participation, and watershed coordination/education services.
7. Phil Peterson Stillwater Sciences *Technical Lead*	**B.S. Biology**, Principia College, 1974 **M.S. Fisheries Science**, University of Washington, 1980	25 years	Water quality modeling oversight / lead and TMDL development support.
8. Steve Ralph Stillwater Sciences *Technical Lead*	**B.S. Biology**, George Mason University, 1973 **M.S. Wildlife Biology**, College of Forest Resources, University of Washington, 1978	25 years	Water quality modeling oversight / lead and TMDL development support.
9. Noah Hume Stillwater Sciences *Technical Lead*	**B.S. Mechanical and Ocean Engineering**, University of Rhode Island, 1985 **M.S. Civil and Environmental Engineering**, U.C. Berkeley, 1989 **Ph.D. Civil and Environmental Engineering**, U.C. Berkeley, 2000	15 years	Lead water quality modeling.
10. Shawn White Stillwater Sciences *Project Support*	**B.S. Natural Resources**, Cornell University, 1997. **M.S. Rangeland Ecosystem Sciences**, Colorado State University, 2002	2 years	Project support water quality modeling and fieldwork.

Staff	Degrees	Years of Experience	Service Matrix Support
11. Maia Fleming-Singer Stillwater Sciences *Project Support*	**B.S. Environmental Engineering Sciences**, University of Florida, Gainesville, 1995. **M.S. Civil & Environmental Engineering,** University of California Berkeley, 1997 **Ph.D. Civil & Environmental Engineering**, University of California Berkeley, 2002	9 years	Project support water quality modeling.
12. Peter Baker Stillwater Sciences *Technical Lead*	**B.A. Mathematics**, University of Kansas, 1981 **Ph.D. Mathematics**, University of California Berkeley, 1987	14 years	Lead statistical analysis and project support water quality modeling.
13. David Zajanc Stillwater Sciences *Project Support*	**B.S. Resource Management**, University of California Berkeley, 1994 **M.S. Natural Resources** (Fisheries), Humboldt State University, 2003	2 years	Project support statistical analysis and water quality modeling.
14. Carl Bolstad Stillwater Sciences *Project Support*	**B.S. Forest Resource Management**, University of Washington, Seattle, WA, 1998 **M.S. Computing and Software Systems**, University of Washington, Seattle, WA (in process)	4 years	Project support GIS and water quality modeling.

Staff	Degrees	Years of Experience	Service Matrix Support
15. Rafael Real de Asus Stillwater Sciences *Project Support*	**B.A. Physical Geography, with emphasis in Geomorphology**, Universidad de Zaragoza, Departamento de Geografia, Spain, 1983 **M.L.A., Landscape Architecture**, University of Pennsylvania, 1990	13 years	Project support GIS, water quality modeling, and land use planning.
16. Todd Hoitsma Hoitsma Ecological Inc. & ADC Native Plant Nursery *Technical Lead*	**B.S. Biology**, Lewis and Clark College, 1984 **M.S. Forest / Riparian Ecology**, University of Montana, 1996	14 years	Lead remote sensing and revegetation and project support for monitoring services.
17. Wease Bollman (and company support staff) **Rhithron Associates** *Technical Lead*	**B.A**. St. Lewis University, 1975 **M.S. Environmental Studies**, University of Montana, 1998	13 years	Biologic monitoring project support services.
18. Loren Balhs Hannaea *Technical Lead*	**B.S. Fish and Wildlife Management**, University of Minnesota, 1966 **Ph.D. Botany**, Montana State University, 1971 **Post Doctoral Fellow**, NSF Gallatin Canyon Project, Montana State University, 1971	32 years	Project support biologic monitoring.
19. Nick Hoyrup *Technical Lead*	**B.S. Engineering**, Montana College of Mineral Science & Technology, 1974	3 years (30 total with past experience)	Lead watershed coordination and project support monitoring and watershed education services.

Staff	Degrees	Years of Experience	Service Matrix Support
20. Ann Schwend **Second Nature L&D** *Construction Lead*	**B.S. Plant and Soil Science**, Montana State University, 1988 **M.S. Land Rehabilitation**, Montana State University, 1995	4 years	Lead heavy construction and project support for revegetation, and land use planning.

4.0 METHODS FOR PROVIDING SERVICES AND QUALITY ASSURANCE (40 PERCENT)

Montana DEQ, like many state environmental agencies, is grappling with the responsibility to monitor and assess state water quality, establish TMDLs, and develop effective implementation plans under a tight schedule.

We will begin our technical presentation of project approach by organizing our overall understanding of TMDLs into Section 4.1.1 through 4.1.9 and outline how implementation plans are to be developed within the framework of data limitations, multiple stakeholders and interest groups, and complex natural systems. This discussion is important in terms of framing the effort required by DEQ. We will follow the discussion of the overall TMDL process with a presentation of our project approach for the project requirements specified in the Request for Proposals (RFP).

4.1 METHODS, WORK PLAN, AND QUALITY ASSURANCE

Each service area that the KirK team is soliciting is organized into nine sections. A header for each service areas is provided for review purposes following the RFP format.

4.1.1 Water Quality Monitoring - Service Areas 1 through 3

Three service areas related to water quality monitoring and watershed assessments are combined in Section 4.1.1 to address fixed stations and probabilistic sampling design, stream and lake monitoring, and identification of reference sites. All three of the water quality monitoring service areas include associated biologic, habitat, and physical monitoring and are intrinsically linked to watershed health and beneficial use determination. The KirK team is well versed in watershed assessments and especially water quality monitoring as shown in the diversity of projects in Table 2 and in the resumes in Appendix A.

1. Water Quality Monitoring - Fixed Stations and Probabilistic Design

References: For references see Table 2 and contact for project numbers 2, 3, 4, 6, 16, and 20.

Staff Qualifications: Table 3 lists the educational background and experience of 20 professionals that were hand picked to work on this contract and to provide support services and technical expertise. Additional personnel are available on an as needed basis and costs for these staff are included in Section 5.0, Cost Proposal. For the 20 selected staff, natural science degrees make up 75 percent of the pool, engineering degrees are 20 percent, and the remaining 5 percent is a Ph.D. mathematician included on the team for statistical analysis. All of the staff in Table 3 may work on this service area; however, primary staff members for this service area are listed in Table 4.

Table 4. Professional Staff for Monitoring Services 1 through 3
(See also Figure 1 Team Organization Chart & Table 3)

Staff (See Table 3 for Experience)	Yes	No
1. Steve MacNeill – ***PM & Lead Areas 1-3***	**XXX**	
2. Scott Payne - *Technical Support*	**XXX**	
3. Randy Huffsmith - *Technical Support*	**XXX**	
4. Ian Magruder - *Fieldwork Support*	**XXX**	
5. Rick Tilstra- *Fieldwork Support*	**XXX**	
6. Brandy Moses - *Fieldwork Support*	**XXX**	
7. Phil Peterson	**X**	
8. Steve Ralph		**XXX**
9. Noah Hume		**XXX**
10. Shawn White	**X**	
11. Maia Fleming-Singer		**XXX**
12. Peter Baker	**X**	
13. David Zajanc		**XXX**
14. Carl Bolstad		**XXX**
15. Rafael Real de Asus		**XXX**
16. Todd Hoitsma - *Fieldwork Support*	**XXX**	
17. Wease Bollman - *Analysis*	**XXX**	
18. Loren Balhs - *Analysis*	**XXX**	
19. Nick Hoyrup	**X**	
20. Ann Schwend		**XXX**

(XXX = key professional & X = support services if needed)

As outlined in Table 3, the proposed project staff has impressive credentials and experience and working knowledge of EPA's water quality guidance and standards handbook and related materials as well as TMDL methodology. Their specific expertise includes:

- Water quality/pollutant loading
- Regulatory compliance
- Hydrology/drainage
- Geochemistry
- Ecosystem restoration
- Ecology/aquatic biology
- Geographic information systems
- Modeling as it applies to collecting field data

Company Profile and Experience: The KirK team has excellent capacity and experience to propose, set up, and monitor fixed stations and develop probabilistic monitoring strategies. The KirK team has proposed and setup fixed stations monitoring sites and transects for watershed assessments in Montana, as well as other western states. Types of fixed station monitoring serviced by the KirK team include water quality, temperature, stream flow (continuous and periodic), and groundwater levels (continuous and periodic). Other types of fixed station and permanent transects include riparian, stream channel cross section, range, as well as BMI, periphyton, and fisheries sampling sites. In terms of sampling sediment at USFS fixed station sites for metals analysis, KirK as part of the Beaverhead Watershed work applied the DEQ sediment sampling protocol to evaluate trace metals concentrations in 2003 as part of the reassessment monitoring on 11 stream reaches.

KirK Environmental, LLC will lead this service area with assistance from Stillwater Sciences and Hoitsma Ecological Inc. Additional support will come from Rhithron Associates and Hannaea. All four firms have excellent experience (Table 2) and skills (Table 3) for the TMDL service areas.

In terms of locating new monitoring sites, KirK understand the importance of using statistically based or probabilistic designs as described in EPA guidance document QA/G-5S Guidance for choosing a Sampling Design for Environmental Data Collection (USEPA 2000). Dr. Peter Baker was selected as part of the support staff specifically for this task and will provide direction for statistically defensible monitoring plans. Table 2 summaries a number of example projects and clients where the KirK team has provided these services.

In general, KirK has been a major player in setting the standard in Montana for water resources innovation, water quality assessment, and excellence. Working with affected communities within a watershed and their associated interest groups, KirK identifies concerns, compiles and analyzes data, prioritizes challenges, determines critical areas to establish objectives, selects monitoring locations, and develops implementation plans that cost-effectively and holistically assess the quality of the watershed.

Method of Providing Service and Quality Assurance: Developing a defensible water quality monitoring plan is a cornerstone for watershed assessment and supporting water quality restoration plans. Fixed station and statistically based water quality monitoring and assessment work for TMDL development can involve collection of key chemical, physical, and biological data in surface waters, and less often in air and groundwater, and as outlined in the RFP can also call for sediment samples. The KirK team will apply the MDEQ sediment sampling protocol if sediment sampling is requested at the USGS fixed station sites. A QA/QC plan and SAP would be prepared prior to commencing fieldwork. As far as remote sensing is concerned, these services are summarized in Section 4.1.3.

For probabilistic sample designs, all of them have these features:

- Reduced bias in the sample results by ensuring that sample units represent the target population
- Provide statistically unbiased estimates of the population mean, population proportions that pass or fail a standard, or other population characteristics
- Allow documentation of the confidence and precision of the population estimates.

Example appropriate statistically based sampling designs have several potential underpinnings. Simple random sampling is the most basic probability-based design. It involves defining the target population and then using a technique to randomly select sample sites. Systematic and grid sampling design with a random start are another approach where sample sites are selected at regularly spaced intervals over space and time. An initial location or time is chosen at random, the remaining sampling locations are defined according to a regular pattern so that all locations are in defined, regular intervals along a linear feature, across an area, throughout a volume, or over time (systematic). Typically you will have applied this approach if you have to search for hot spots or increased concentrations. Random tessellation stratified (RTS) sampling designs incorporate features of simple random sampling and systematic designs using a two-step process developed by Stevens (1997) and Olsen (1999).

This brief review of probabilistic sample design illustrates the proverbial tip of the iceberg and other elements are considered to incorporate additional information, considering stratified random sample designs, unequal probability sampling, cluster sampling, multistage sampling, multiphase sampling, to name a few. The KirK team will work with DEQ to evaluate sample design alternatives, set up, and implement statistically based sample designs that are fixed station, stream reach, reference sites, and 303(d) list reassessments. Lastly, the KirK team is able and willing to collect sediment samples at USGS fixed monitoring stations per MDEQ sampling protocols for metal analysis under the 303(d) reassessment program.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

2. Water Quality Monitoring - Lakes and Streams

References: For references see Table 2 and contact for project numbers 2, 3, 4, 20, and 21.

Staff Qualifications: See previous section on fixed stations and probabilistic designs for staff qualifications and breakout of degrees in Table 3.

Company Profile and Experience: On a large scale, KirK has been a major player in assessing numerous water bodies in Montana as either an oversight contractor or conducting the work in it entirety. In each case, KirK worked with affected communities within a watershed and their associated interest groups, identified concerns, compiled and analyzed data, prioritized challenges, determined critical areas, established objectives, selected monitoring locations, and developed an implementation plan that cost-effectively and holistically assessed the water quality of the watershed.

For this service area, the KirK team has excellent capacity and experience to monitor streams and lakes. The KirK team has completed hundreds of miles of comprehensive stream corridor inventories, riparian assessments, sampled water bodies for chemical and biologic conditions, and evaluated literally thousands of acres for forest canopy and its affect on water quality and biologic receptors. Example projects are provided in Table 2 and include large scale watershed assessments in the Beaverhead Watershed, Clark Fork River Basin, Jefferson River, South Fork Eel River (California), Tuolumne River (California), and Napa River Basin (California), to name a few. Between the project team members from KirK, Stillwater Sciences, Rhithron Associates, Hannaea, and Hoitsma Ecological, the equipment, expertise, and ability to monitor streams and lakes is exceptionally well supported. Also, the training and education the primary staff hold for this service area are also exceptional in terms of geomorphology, habitat, source assessments (see also 4.1.4), remote sensing (see also 4.1.3), water quality monitoring, and support services needed to tie these data to development of a TMDL / water quality restoration plan.

KirK Environmental, LLC will lead this service area with assistance from Stillwater Sciences and Hoitsma Ecological Inc. Additional support will come from Rhithron Associates and Hannaea. All four firms have excellent experience (Table 2) and skills (Table 3) for the TMDL service areas.

Method of Providing Service and Quality Assurance: In addition to the established fixed station monitoring described in Section 4.1.1, study design in priority reaches will be very important for cost-effective data collection and application of information. Biological sampling will be very important, including benthic macroinvertebrates (BMI), algae, and chlorophyll *a*, which are indicators of overall health of aquatic ecosystems. It will also be critical, however, to measure chemical and physical data to correlate with the biological information to determine stressors, compare to standards and determine beneficial uses, and develop effective restoration strategies. Collection of sediment samples for trace metal analyses will be an important part of this, due to the fact that sediment itself can often be a pollutant, enhance transport metals and other contaminants from watersheds, and be a long-term source of chemicals to the water column and impact biota. Collection and analysis of fisheries data will also be needed to evaluate ecosystem health in the long term, including fish species, diversity, age structure and other population data, and aquatic biota indices such as the Index of Biotic Integrity.

Field data collection and analysis methods will also be needed to evaluate stream geomorphology, physical habitat, floodplain, and watershed characteristics. These efforts should be preceded with remote sensing analysis to streamline the field assessment phase. The physical assessment component is critical to assess aquatic habitat in steam corridors, the geomorphic and hydrologic functioning of channels, and potential watershed influences on the channels and pollutant sources. Remote sensing data, including aerial photographs and satellite images, can be very useful and cost-effective for the assessments, particularly for larger watershed and river systems, and for evaluating historic and future changes over time, and is described later in this proposal in Section 4.1.3. All of these monitoring methods will be important for the not only fixed station monitoring, but also stream reach assessments, reference sites, and 303(d) reassessments, as required by DEQ.

The KirK team understands and will apply the water quality sampling protocols MDEQ lists online as their SOPs. Some variation in the methods may be required depending on local watershed conditions. Similarly, biologic sampling protocols and analysis will be completed per MDEQ method as supported by Rhithron Associates and Hannaea. Lastly, stream channel assessment methodology for physical, habitat, and geomorphology will be developed on a case by case basis to match existing data and support development of

a defensible water quality restoration plan. Lastly, as part of any watershed assessment effort, a QA/QC plan is prepared prior to beginning the fieldwork.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

3. Water Quality Monitoring - Reference Sites

References: For references see Table 2 and contact for project numbers 3, 4, 8, 20, and 21.

Staff Qualifications: See previous section on fixed stations and probabilistic designs for staff qualifications and breakout of degrees in Table 3.

Company Profile and Experience: For this service area, the KirK team has excellent capacity and experience to identify reference sites for chemical, physical, and biologic conditions. As summarized in Service Area 2 above, the KirK team has completed hundred of miles of comprehensive stream corridor inventories, riparian assessments, sampled waterbodies for chemical and biologic conditions, and evaluated literally thousands of acres for forest canopy and its affect on water quality and biologic receptors. These data are often used in conjunction with professional judgment and land use to identify reference conditions. The KirK team has the expertise to identify and catalog reference sites to help support TMDL / water quality restoration plan development. Example projects are presented in Table 2, and project number 8 for the North Umpqua River (Oregon) Relicencing Project completed by Stillwater Sciences provides a good example where a modeling approach is taken to help sort out natural vs. anthropogenic impacts in watershed.
KirK Environmental, LLC will lead this service area with significant assistance and leadership from Stillwater Sciences and Hoitsma Ecological Inc. Additional support will come from Rhithron Associates and Hannaea. All four firms have excellent experience (Table 2) and skills (Table 3) for the TMDL service areas.

Between the project team members from KirK, Stillwater Sciences, Rhithron Associates, Hannaea, and Hoitsma Ecological, the equipment, expertise, and ability to monitor streams and lakes is exceptionally well supported. Also, the training and education the primary staff hold for this service area are also exceptional in terms of geomorphology, habitat, source assessments (see also 4.1.4), remote sensing (see also 4.1.3), water quality monitoring, and support services needed to tie these data to development of a TMDL / water quality restoration plan.

Method of Providing Service and Quality Assurance: Beneficial use support determinations are often based on the monitoring data collected and analysis and modeling work. This often requires integrating water quality standards with the use determinations, and application of reference or background conditions to evaluate if criteria are being achieved and designated uses supported. Reference sites may be identified in historic data archives (e.g., USFS MacNeill core data, extensive TSS sampling, etc.); new data collected in watershed aimed at chemical, physical, and biologic inventories, and through modeling.

Chemical reference conditions are by far the most challenging to support because you generally need a statistically defensible database to support them, which typically is unavailable. To identify reference sites, it is preferable to work within the host watershed. However, if there is lack of data in the host watershed, adjacent watershed with similar geomorphic, climate, and physical conditions can be substituted.

In terms of monitoring services needed to identify reference reaches, the KirK team understands and will apply the water quality sampling protocols MDEQ lists online as their SOPs. Some variation in the methods may be required depending on local watershed conditions. Similarly, biologic sampling protocols and analysis will be completed per MDEQ method as supported by Rhithron Associates and Hannaea. Lastly, stream channel assessment methodology for physical, habitat, and geomorphology will be developed on a case by case basis to match existing data and support development of a defensible water quality restoration plan.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

4.1.2 TMDL Development - Service Areas 4 through 9

KirK has a proven track record in planning and implementing surface water quality management programs around the "watershed approach." The watershed approach is the cornerstone of the national Clean Water Act (CWA) plan. The following is an overview of TMDL process and how the KirK team applies the watershed approach to developing water quality restoration plans. This overview brings together all of the main components of a water quality restoration plan including targets, source assessment, load allocations, setting TMDL, stakeholder involvement, and effectiveness monitoring.

Water Quality Restoration Plan Overview: By using the watershed approach, the problems in the watershed are analyzed in a holistic fashion. Based upon that analysis, a solution can be developed to address the problems that are preventing the attainment of water quality standards. Those problems can be physical, chemical, or biological, or a combination of all three. Corrective action programs, TMDL definitions, and the synergistic and antagonistic relationships of the physical, chemical, and biological factors in a watershed require a specified watershed approach.

At the heart of the watershed approach is the development of a water quality restoration plan. The purpose of developing a water quality restoration plan is to delineate the actions needed to restore the receiving water so that its waters will meet the established water quality standards and the related designated uses. To be fair and complete, the plan must address all point and nonpoint sources (i.e., sanitary sewer overflows, storm water, illicit connections, storm water, agricultural runoff, etc.) reaching the waterbody.

In addition, all of the other stressors that adversely impact the achievement of water quality standards (i.e., lack of habitat, flow variability, increasing imperviousness, etc.) need to be addressed with structural and/or policy mechanisms, as appropriate, based upon each stressor's adverse impact on achieving water quality standards in the waterbody. Without this understanding, the restoration activities often treat the symptoms rather than affecting a cure. In some situations, developing a TMDL on specific parameters may be a futile effort because it will not result in meeting water quality standards unless other stressors are addressed as well.

By looking at the holistic issues in the watershed, there may be situations where TMDLs may not be necessary because impairments to stream segments do not actually exist or may be eliminated at some time in the future because of other actions undertaken in the watershed. For these situations, an approach needs to be developed to allow for delisting of appropriate segments from the 303(d) list. The holistic assessment of a watershed may also raise important use attainability issues that can be addressed under the watershed approach. In addition, another method of managing nonattainment segments under the watershed approach may involve developing policy and programs to facilitate the use of effluent trading in certain situations.

To develop an appropriate implementation plan, it is critical to establish a hierarchy of pollution sources in watershed-point sources and nonpoint sources based upon the adverse water quality impacts of identified sources. It is equally important to keep reinforcing, at a watershed level, the concept of prioritizing the control of those sources and the other stressors to get desired environmental protection. It may take a long time to correct some of these pollution sources or other physical, chemical, or biological stressors so it is important to prioritize the control programs. Therefore, it is very important to note the use of phasing of controls and the need to use an iterative approach as appropriate in certain situations in certain watersheds. The tools needed to solve water quality problems in a watershed must be geared to that watershed, given each watershed's unique set of dischargers, politics, and users. The water quality restoration plan that is developed must be tailored to address watershed specific problems. Water quality monitoring is reviewed in Section 4.1.1. of this proposal.

Development and Using Implementation Plans: The modeling and analyses for the TMDLs for each waterbody segment will yield target loadings that must be met to meet water quality standards and to obtain the needed water quality improvement. The accomplishment of the necessary actions to reach these targets will involve very substantial efforts and expenditures by a large number of parties within each watershed. Depending upon the specific issues and their complexity in each of the watersheds, the time frame for achieving water quality standards will be developed. Subject to additional discussions with DEQ on this very important issue, KirK will develop an implementation plan for each target watershed. The plans will be founded on a timeline of the appropriate number of years.

Under this proposal, KirK will develop the particulars of what must be addressed in a comprehensive water quality restoration plan to achieve water quality standards and related designated uses in each specific river and all of the other stressors, such as lack of habitat and flow variability that prevent the current attainment of water quality standards. The plan of implementation will address who must do what, by when, to reduce the loading to get to the TMDL number. Based upon available data, it may be possible to make decisions, even preliminary, as to which physical, chemical, and biological stressors must be addressed.

The proposal will delineate a recommended list of the sources of stressors that are contributing to the water quality impairments. The amount of the reduction needed from various sources to achieve the water quality limiting parameter will then be delineated. For nonpoint sources, the use of BMPs is the most viable way to proceed to get the desired reduction in loading. The effectiveness of various BMPs will be factored into the modeling and methodologies to develop the range of options of BMPs to use. Associated with those BMPs will be cost information, as available. Reductions from point services through waste stream management, pretreatment controls, and other structural and nonstructural programs will also be identified. KirK's extensive experience in this area will be utilized to help focus this effort and communicate options to DEQ.

Included in the plan of implementation will be recommendations on the prioritization and phasing for addressing needed physical, chemical, and biological control programs and related actions to achieve the water quality standards for the designated waters. In order for the implementation plan to be workable, it will require the phasing of activities.

Recommendations will be included to address the need for additional monitoring or related data gathering. This will involve testing, monitoring, and evaluating applied strategies and incorporating new knowledge into management approaches that is based on sound findings.

The water quality restoration plan will also delineate a recommended program and/or process with options, if possible, on the recommended approach to promote public outreach and garner stakeholder involvement to get the overall program implemented. This aspect of the plan of implementation is necessary to obtain agreements with the sources of the stressors that are causing the water quality standards violations. KirK anticipates that major stakeholders in the implementation process will include public and private wastewater treatment works, agricultural interests, municipalities and industries that have storm water, interested private citizens, and environmental groups. The mix of these stakeholders will vary from watershed to watershed.

Summary: It is clear that the relationship between developing a TMDL and use of the watershed approach is very important. The watershed management plan can specify the amount of pollution or other stressors that need to be reduced/addressed to meet water quality standards, and can allocate pollution control or management responsibilities among sources, including both point and nonpoint sources, in each watershed. In essence, this can fulfill the elements of a TMDL as it will delineate the process by which the water quality standards will be achieved, clearly identifying what actions must be taken by whom over what time frame to meet the standards.

4. TMDL Targets

References: For references see Table 2 and contact for project numbers 1, 4, 9, 12, and 20.

Staff Qualifications: Table 3 lists the educational background and experience of 20 professionals that were hand picked to work on this contract and to provide support services and technical expertise. Additional

personnel are available on an as needed basis and costs for these staff are included in Section 5.0 Cost Proposal. For the 20 selected staff, natural science degrees are 75 percent of the pool, engineering degrees are 20 percent, and the remaining 5 percent is a Ph.D. mathematician included on the team for statistical analysis. All of the staff in Table 3 may work on this service area; however, primary staff members for this service area are listed in Table 5.

Table 5. Professional Staff for TMDL Services 4 through 9
(See also Figure 1 Team Organization Chart & Table 3)

Staff (See Table 3 for Experience)	Yes	No
1. Steve MacNeill - ***PM***	**XXX**	
2. Scott Payne - ***Lead Areas 4 - 8***	**XXX**	
3. Randy Huffsmith - *Technical Support*	**XXX**	
4. Ian Magruder	**X**	
5. Rick Tilstra		**XXX**
6. Brandy Moses	**X**	
7. Phil Peterson - *Technical Support*	**XXX**	
8. Steve Ralph - *Technical Support*	**XXX**	
9. Noah Hume - *Technical Support*	**XXX**	
10. Shawn White	**X**	
11. Maia Fleming-Singer	**X**	
12. Peter Baker	**X**	
13. David Zajanc		**XXX**
14. Carl Bolstad	**X**	
15. Rafael Real de Asus	**X**	
16. Todd Hoitsma		**XXX**
17. Wease Bollman - *Technical Support*	**XXX**	
18. Loren Balhs - *Technical Support*	**XXX**	
19. Nick Hoyrup		**XXX**
20. Ann Schwend		**XXX**

(XXX = key professional & X = support services if needed)

As outlined in Table 3 and in the monitoring section above, the proposed project staff has impressive credentials and experience and working knowledge of EPA's water quality guidance and standards handbook and related materials as well as TMDL methodology. Their specific expertise includes:

- Water quality/pollutant loading
- Regulatory compliance
- Hydrology/drainage
- Geochemistry
- Ecosystem restoration
- Ecology/aquatic biology
- Geographic information systems
- Modeling as it applies to collecting field data

Company Profile and Experience: The KirK team has excellent capacity and experience to support all aspects of TMDL development and documentation. The project team has direct experience developing targets, conducting source assessments, allocating pollutions loads, and determining TMDLs in support of water quality restoration plans, TMDL stakeholder participation, and effectiveness monitoring. Example projects are in Table 2 and excellent examples include Flathead Lake support to MDEQ (project number 1 on file at MDEQ), East Valley project in the Upper Clark Fork River Basin (project number 4 on file at MDEQ), and South Fork Eel River (California) (project number 9). As outlined in Section 2.0 of the proposal, the project team is a blend of traditional scientific field analysis that is need to support TMDL development from KirK, Hoitsma Ecological,

Rhithron, and Hannaea, and cutting edge / state-of-the-art modeling approaches from Stillwater Sciences required to streamline and fast-tract TMDL development.

KirK Environmental, LLC will lead this service area with significant assistance and leadership from Stillwater Sciences. Additional support will come from Rhithron Associates and Hannaea. All four firms have excellent experience (Table 2) and skills (Table 3) for the TMDL service areas.

Method of Providing Service and Quality Assurance: TMDL targets should be developed using the range of monitoring methods discussed previously to determine reference conditions and data trends. We will develop targets based on numeric water quality criteria, pollutant concentrations and loads, habitat and geomorphic measures, and biological criteria. KirK will develop comprehensive reports including all of this information outlining both the targets and the supporting information. These reports are critical to getting buy-in and support from other agencies and the public for subsequent implementation and restoration plans. An internal peer reviewed approach with in the project team will be used to ensure the targets are well supported and defensible.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

5. TMDL Source Assessments/Delineation

References: For references see Table 2 and contact for project numbers 1, 4, 9, 12, and 20.

Staff Qualifications: See previous section on targets for staff qualifications and breakout of degrees in Table 3.

Company Profile: See previous section on targets for company profile.

Method of Providing Service and Quality Assurance: Source assessment/delineation is a critical TMDL component and will involve source delineation and assessment activities needed to map and prioritize nonpoint source pollution causes. Examples are found in road sediment sources, stream bank sediment sources, riparian cover for head loading in stream, animal feeding operation on stream, etc. Source delineation and assessment is critical to linking violations of water quality standards and their impairment sources, allocating pollutant sources, and recommending BMPs. This will include using a range of methods, including investigative monitoring based on field data and interpretation and analysis of aerial photos, remote sensing images and GIS coverages. It will also include entering all data collected into approved databases and the National Hydrography dataset, and conducting cost-benefit analyses of BMPs for a range of pollution problems. All of this information will be provided in comprehensive reports for presentation to the agencies and the public.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

6. TMDL Load Allocation

References: For references see Table 2 and contact for project numbers 1, 4, 9, 12, and 20.

Staff Qualifications: See previous section on targets for staff qualifications and breakout of degrees in Table 3.

Company Profile: See previous section on targets for company profile.

Method of Providing Service and Quality Assurance: The process of developing TMDLs requires the integration of point, nonpoint, and natural background impacts spatially and temporally into water quality management planning and permitting. It also requires a geographically based approach to prepare load and waste load allocations for sources and stresses that impair waterbody integrity. Supporting load allocation is possible based on analysis of a rigorous set of chemical, physical, and biologic data for watersheds. Often these data sets are incomplete for an analytical breakout of load allocation. To this end, modeling sources of sediment and temperature, for example, is often used to help differentiate pollution loads and develop pie charts depicting how the pollution load is divided between natural and anthropogenic sources.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

7. Total Maximum Daily Loads

References: For references see Table 2 and contact for project numbers 1, 4, 9, 12, and 20.

Staff Qualifications: See previous section on targets for staff qualifications and breakout of degrees in Table 3.

Company Profile: See previous section on targets for company profile.

Method of Providing Service and Quality Assurance: The "TMDL" is one part of water quality restoration plans and also by definition under the Clean Water Act. After several years while the EPA and MDEQ have been working on developing water quality restoration plans, the term TMDL has taken a broader platform in application, referring to the entire process and end document developed for a water quality restoration plan. For this write up, we assume MDEQ is referring to a broader platform and we include discussion on more then Total Maximum Daily Load.

TMDLs are used to define the total amount of pollutants that may be discharged into a particular stream segment within any given day based on a particular use of that stream segment. Developing TMDLs must, therefore, account for stream users and types of present and future uses, habitat, flow variability, sedimentation, and current and future point and nonpoint pollutant loadings that may impact the stream. Defining a TMDL for any particular stream segment must, therefore, take into account not only the science related to physical, chemical, and biological processes that may impact stream water quality, but must also be responsible to temporal changes in the watershed and likely influences of potential solutions on entities that reside in the watershed. To sum it up, the process of developing TMDLs is not only challenging technically, but must be grounded in terms of local politics, stream uses, and potentially feasible structural, as well as nonstructural solutions.

The TMDL establishes the allowable loadings or other water quality parameters for a waterbody. In doing so, the TMDL defines the basis for water quality-based controls and the need for implementable solutions. The TMDL process provides a mechanism for integrating the management of both the point and nonpoint pollution sources, as well as issues related to stressors, such as lack of habitat and flow variability, that contribute to impairment of use in a waterbody. When implemented, the specified solutions should provide the pollution reduction necessary to meet appropriate water quality standards, which may be developed based on site-specific criteria or waterbody uses.

Based on historic EPA guidance and policy, the following provides a brief summary of the minimum requirements and a standard for review and development of TMDLs:

- Application of TMDLs result in maintaining and attaining water quality standards (including the numeric, narrative, use classification, and anti-degradation components of the standards; a "phased" TMDL can be used where a level of uncertainty exists; in addition, TMDLs can rely on either regulatory or voluntary approaches to attain standards).

- TMDLs have a quantified target or endpoint (a numeric water quality standard often serves as the target, but any indicator or set of indicators that represent the desired condition would suffice).

- TMDLs include a quantified pollutant reduction target, but this target can be expressed in any appropriate manner (TMDLs need not be expressed in pounds per day or concentration when alternative means of expression are better suited to the waterbody problem; TMDLs can be expressed as mass per unit of time, toxicity, percent reduction in sediment or nutrients, or other measure).

- TMDLs must consider all significant sources of the stressor of concern (all sources or causes of the stressor must be identified or accounted for in some manner; this accounting can lump several sources of unknown origin together; the TMDL need only address the control of a subset of these sources as long as the water quality standards are expected to be met).

- TMDLs must be supported by an appropriate level of technical analysis (allocations for nonpoint sources are often best professional estimates, whereas waste load allocations for point sources are often based on a more detailed analysis).

- TMDLs must contain a margin of safety and consider seasonality (a margin of safety can be either explicit or implicit in the analysis or assessment).

- TMDLs apportion responsibility for taking actions (allocations may be expressed in a variety of ways such as by individual discharger, by tributary watershed, by source or land use category, by land parcel, or other appropriate scale or dividing responsibility).

- TMDLs involve some level of public involvement or review (public participation should fit the needs of the particular TMDL).

Modeling plays an important role in determining the TMDL and estimating the effectiveness of various structural and nonstructural solutions in meeting water quality objectives. Section 4.1.4 is intrinsically linked to this section on TMDL development. The target constituents are based on the 303(d) listings for each watershed and are allocated to contributing sources such as point and nonpoint. We proposed to provide TMDL support services that collect appropriate monitoring data as outlined in Section 4.1.1 and 4.1.3, and bring these data together into a TMDL with the support of modeling, especially for sediment and temperature related water quality impairment causes. Other impairment issues, such as metals may not require modeling to develop a TMDL, as well as nutrients depending on the scale and magnitude of the problem. Unique pollution problems, such as organic solvents may or many not require modeling support depending on the project.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

8. Stakeholder Participation

References: For references see Table 2 and contact for project numbers 1, 2, 5, 6, and 9.

Staff Qualifications: See previous section on targets for staff qualifications and breakout of degrees in Table 3.

Company Profile: See previous section on targets for company profile and also Section 4.1.8 on watershed coordination and communication/education. Scott Payne, Nick Hoyrup, and Brandy Moses are skilled at working with local government, citizens, and stakeholders working through the TMDL process. Example outreach includes the Flathead Basin Commission, Blackfoot Challenge, and soon the Ruby River once the TMDL is ready for public comment.

Method of Providing Service and Quality Assurance: Stakeholder participation is required for developing water quality restoration plans. EPA and MDEQ are mandated to involve the public in the review process one the plan is drafted. Outreach is needed to properly notify residents, businesses, government agencies, and stakeholders in the waterhshed when the draft TMDL / water quality restoration plans are available for comment, provide the document(s) in hard copy and electronic format as practical. In addition, the process requires at least one, and possibly more public meetings to present and review the findings, pending MDEQ direction, and solicit public input. Depending upon there local watershed group (if there is one), land use in the watershed, and stakeholder / citizen interest, the process can be simple or complex. To help streamline the process, keeping local interests involved in the TMDL process is advisable if adequate support can be provided. Lastly, some public processes for finalizing TMDLs have taken quite a while if the TMDLs have to be modified to meet current submittal requirements. We will strive to keep up new approaches and requirements for TMDLs to limits these delays.
For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

9. TMDL Effectiveness Monitoring

References: For references see Table 2 and contact for project numbers 1, 2, 4, 5, and 9.

Staff Qualifications: See previous section on targets for staff qualifications and breakout of degrees in Table 3.

Company Profile: See previous section on targets for company profile and also Section 4.1.1 on water quality monitoring.

Method of Providing Service and Quality Assurance: Effectiveness monitoring will involve using many of the monitoring methods discussed above in Section 4.1.1. In some instances, it could include developing evaluation methods that include data collection, statistical analysis using hypothesis testing and trend evaluation, and interpretation of deterministic processes to evaluate changes over time and casual relationships for post-BMP and restoration improvements. Detailed reports will be generated to present results and provide quantitative information regarding effectiveness monitoring and improvements over time. Currently, KirK is involved with effectiveness monitoring on restoration projects underway in the Upper Clark Fork River Basin East Valley project where funding is in place to restore watershed health (project number 4), which is aimed at meeting target and load reductions as stipulated in the water quality restoration plan on file at MDEQ.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

4.1.3. Remote Sensing and GIS - Support Services 10 and 11

Two service areas related to remote sensing and GIS are combined in Section 4.1.3 to aid TMDL development and watershed assessment / monitoring. While separated in this proposal, both remote sensing and GIS are intrinsically linked to watershed health and beneficial use determination, TMDL development, and water quality / watershed monitoring. The KirK team is well versed in remote sensing and GIS support services as outlined in Table 2 projects and resumes in Appendix A.

10. Remote Sensing

References: For references see Table 2 and contact for project numbers 2, 3, 4, 9, and 19.

Staff Qualifications: Table 3 lists the educational background and experience of 20 professionals that were hand picked to work on this contract and to provide support services and technical expertise. Additional personnel are available on an as needed basis and costs for these staff are included in Section 5.0 Cost Proposal. For the 20 selected staff, natural science degrees are 75 percent of the pool, engineering degrees are 20 percent, and the remaining 5 percent is a Ph.D. mathematician included on the team for statistical analysis. All of the staff in Table 3 may work on this service area; however, primary staff members for this service area are listed in Table 6.

Company Profile and Experience: The KirK team has excellent capacity and experience to support all aspects of remote sensing image acquisition, digitizing of images for input into software such as GIS, image interpretation, and identification limiting factors for watershed health. Past experience on project considered channel conditions / configuration, riparian class / condition, sediment sources, road density, habitat issues, forest health, cover analysis, historic image comparison, to name a few. Example projects include 19 in Table 2 as well as 2, 3, and 4.

Hoitsma Ecological Inc. will lead this service area with help from KirK Environmental, LLC and Stillwater Sciences. All three firms have excellent remote sensing experience (Table 2) and skills (Table 3).

Table 6. Professional Staff for Remote Sensing and GIS Services 10 & 11
(See also Figure 1 Team Organization Chart & Table 3)

Staff (See Table 3 for Experience)	Yes	No
1. Steve MacNeill **- *PM***	**XXX**	
2. Scott Payne - *Technical Support*	**XXX**	
3. Randy Huffsmith,		**XXX**
4. Ian Magruder **- Lead Area 11**	**XXX**	
5. Rick Tilstra		**XXX**
6. Brandy Moses - *Technical Support*	**XXX**	
7. Phil Peterson	**X**	
8. Steve Ralph	**X**	
9. Noah Hume - *Technical Support*	**XXX**	
10. Shawn White		**XXX**
11. Maia Fleming-Singer		**XXX**
12. Peter Baker		**XXX**
13. David Zajanc		**XXX**
14. Carl Bolstad - *Technical Support*	**XXX**	
15. Rafael Real de Asus - *Technical Support*	**XXX**	
16. Todd Hoitsma ***- Lead Area 10***	**XXX**	
17. Wease Bollman		**XXX**
18. Loren Balhs		**XXX**

Staff (See Table 3 for Experience)	Yes	No
19. Nick Hoyrup		**XXX**
20. Ann Schwend		**XXX**

(XXX = key professional & X = support services if needed)

Method of Providing Service and Quality Assurance: Remote sensing is the precursor to field data collection, and image analysis that is typically focused stream geomorphology, physical habitat, riparian class / health analysis, floodplain, and watershed characteristics such as road crossings, road density, sediment sources, historic mining sites. This is often the first critical step to assessing aquatic habitat in steam corridors, the geomorphic and hydrologic functioning of channels, and potential watershed influences on the channels and pollutant sources. Remote sensing data, including aerial photographs and satellite images, can be very useful and cost-effective for the assessments, particularly for larger watershed and river systems, and for evaluating historic and future changes over time. All of these monitoring methods will be important for the fixed station monitoring, stream reach assessments, reference sites, and 303(d) reassessments, as outlined earlier. The following is more detailed explanation to the KirK team remote sensing support services.

Example Methods: For most projects, a relatively simple and focused aerial photo interpretation effort is a useful tool to stratify stream and riparian condition and create a reference for stream and biologic assessment, water quality monitoring, and evaluate conditions along the full length of impaired stream. This analysis involves examination of recent aerial photos of the watershed, looking at factors such as riparian condition, sediment source areas, and slope and stream stability factors, and evaluating areas with little or no access for on-site evaluations. Factors that should be evaluated and deliverables include but are not limited to the following assuming a limited aerial image database:

- Digitized DOQs and USGS quad images. Copies (paper and possibly digital) of all other appropriate supporting aerial photos along with NHD coverage with the following attributes attached to specific stream segments. The stream segments will be delineated using riparian cover class, land ownership patterns (public vs private), and Rosgen level 1 types. Sediment sources will be depicted with polygons and points as a separate coverage. Spatial coverage of the aerial photo assessment will be the streams listed in the 1996 or latest 303d lists.
- Cursory Rosgen level 1 stream channel type (based on valley slope, stream slope, valley width, stream sinuosity) using the most recent USGS digital topographic maps and orthophoto quad image mosaic (composed of DOQs).
- Riparian cover class
- Percent riparian canopy opening
- Large woody debris recruitment potential
- Adequate riparian buffer
- Abundance of road stream crossings
- Potential sediment sources such as steep slopes and high skid road densities
- Evidence of historic channel manipulation
- Obvious natural or anthropogenic practices that could be sediment sources
- Indicators of landslide prone areas or unstable slopes
- Obvious mine sites that could be metals source or stream morphological issues
- General comparison of road density and proximity to stream on public and private lands

The riparian condition as determined from the aerial photo assessment is broken into three general categories and summarized on photo-interpretation data sheets for each stream:

Poor- Cleared riparian vegetation on one or more sides, lack of riparian buffer, low large woody debris.

Fair- Generally good buffer but may lack large woody debris, or shows evidence of other land clearing disturbance adjacent to stream.

Good- Little to no evidence of clearing in riparian zone or channel manipulation, high vegetation density and large woody debris recruitment potential.

The aerial work begins in earnest as soon as the project is officially funded and in advance of the field tasks requiring draft aerial assessments. This aerial assessment and review are conducted on a stream by stream basis in advance of most of field tasks. The rationale for selection of the detailed field assessments and cursory ground assessment is evaluated as part of the photo-interpretation. A technical advisory review of monitoring recommendations prior to fieldwork should be scheduled to ensure project monitoring goals and related needs, such as TMDL develop are represented.

Fieldwork refines and calibrates the determinations of riparian condition and health made through photo-interpretation. Collateral information should be used when ever possible and includes aerial photos of other agencies (USFS, BLM, NRCS, etc.), recent riparian health assessment and mapping conducted by others, stream morphological assessments by others and field inspections.

Deliverables should be in an ArcView spatial database including stream by stream coverages delineating (color coding) riparian condition categories as noted above and identifying and attributing sediment sources, obvious adjacent land use problems and other conditions possibly resulting in impairment. DOQQ and digital quad mosaics should also be provided along with copies (paper and possibly digital) of the appropriate set of collateral images used.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

11. Geographical Information Systems (GIS)

References: For references see Table 2 and contact for project numbers 2, 3, 4, 7, and 11.

Staff Qualifications: See previous section on remote sensing for staff qualifications and breakout of degrees in Table 3.

Company Profile and Experience: GIS is an important tool for water quality monitoring, assessment, TMDL development, and watershed management and restoration. KirK Environmental, LLC and Stillwater Sciences have applied GIS software applications (ArcView, ArcGIS, various tool boxes, etc.) to evaluate water quality and stream habitat issues, present data analysis and modeling results, target/prioritize source areas and restoration efforts, and aid in community outreach efforts. The project team attributes GIS databases to evaluate watershed characteristics, storm water runoff, and water quality problems and pollutant sources on spatial basis where end users can view the theme data used to develop maps. For example, its beneficial to link GIS with water quality and other models to develop decision support capabilities to manage critical resources in watersheds, including water supply, water quality, and aquatic habitat as is being done in the Beaverhead TMDL planning area and the Eel River TMDL project (project numbers 3 and 9 in Table 2). Also, it is important to link remote sensing assessment with GIS and databases to aid in analysis and interpretation of spatial data, as well as trends over time of watershed and stream corridor characteristics.
KirK Environmental, LLC will lead this service area for general mapping needs and has provided these types of mapping services and data gathering for many Montana watersheds (Ruby Watershed, Beaverhead Watershed, Gold Creek, Upper Clark Fork River Basin, Brown's Gulch, etc.). For TMDL related watershed analysis and links to modeling, KirK Environmental, LLC will work closely with Stillwater Sciences who will provide significant assistance and leadership in landscape analysis as outlined below. Both firms have excellent GIS software, color map printing ability, GIS experience (Table 2) and trained GIS professionals (Table 3).

Method of Providing Service and Quality Assurance: A fundamental challenge to large scale monitoring programs or initiatives such as the development of TMDLs across a large geography is the issue of landscape and aquatic habitat diversity. This diversity tends to confuse monitoring results, complicate modeling, and

confound decisions for allocation of limited public funds. Regulations that employ one-size-fits-all rules thwart more site specific approaches, resulting in either under or over protection.
This challenge can be overcome with appropriate scale landscape stratification tools. Recent advances in our understanding of how hill slope processes and natural disturbance regimes relate to long-term river channel characteristics and habitat development shed light on the pieces of a framework for landscape stratification (Montgomery 1999). This kind of framework has been successfully developed and implemented by personnel now working for Stillwater Sciences on a Washington landscape in the southern Olympic Peninsula. This approach was accepted by the federal agencies in the Simpson Resource Company Habitat Conservation Plan (project number 7 in Table 2) and made it possible for the company to also get agreement on sediment and temperature TMDLs for its entire ownership.

The KirK team believes that there is tremendous benefit to extending this kind of landscape stratification to the state of Montana. This approach makes it possible to develop reliable estimates of load allocations for temperature and sediment for water quality impaired and indeed all stream segments in Montana. The science behind this approach is well understood and, rather than creating new information, would bring together existing information in a new way to address previously intractable problems of efficiently identifying appropriate load allocations.

The Simpson project is a great example and was accomplished by loading the surficial geology and soil map layers for the state of Washington into a geographic information system (GIS). Similar mapping information is available for Montana. Areas of like parent geology, soil types and geologic history were delineated along lines of functionally different lithologies and topographies describing the boundaries of what we term “lithotopo” units (“litho” referring to lithology and “topo” referring to topography). Secondarily the channel network was broken into segments according to their likely response to the inputs of wood, water and sediment. In the Simpson case we relied on three attributes to do this: stream size, relative degree of valley confinement, and channel bed morphology. Our approach to reach level channel classification is patterned generally after work done by Montgomery and Buffington (1999) but the concept of process-based channel classification is embraced widely by other practitioners as well (e.g. Rosgen, Paustian, etc.) Our experience suggests that accurate GIS channel segment classification on the first computer analysis is not possible. However an iterative approach that involves field reconnaissance, reclassification of segments based on new data, and repeated GIS updates produces very satisfactory classification results over a short period.

Following the delineation of lithotopo units and characterization of channel segments the landscape is described in sufficient detail to allow reliable modeling of sediment and heat inputs that form the basis for load allocations of a TMDL. Additional information for describing sediment load allocations requires analysis of sequential aerial photos and development of a mass wasting layer that can be overlain with the LTU boundaries and associated with the channel classification to describe differences in natural rates and human-influenced rates of erosion.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

4.1.4. Water Quality Modeling - Support Service 12

The modeling service area is linked to Section 4.1.3 to aid TMDL development and watershed assessment / monitoring. While separated in this proposal, both modeling and TMDL development are intrinsically linked to watershed health and beneficial use determination, TMDL load allocation, source assessment, and water quality / watershed monitoring. The KirK team is well versed in modeling support services as outlined in Table 2 projects and resumes in Appendix A.

Water quality modeling is an important tool for water quality assessment, TMDL development, and watershed restoration planning. Modeling can range from simple analytical, empirical, and statistical models relating

watershed and hydrologic characteristics to water quality, to sophisticated, deterministic models capable of simulating a range of pollutants over time in dynamic mode. The modeling requirements, and sophistication of the model used, will be watershed-specific and depend on many factors including data availability, time and resource constraints, and complexity of the problem.

Some simple models are based on land use characteristics within watersheds and loading factors for typical pollutants. Many watershed loadings and receiving water quality models are available for use in Montana watersheds, including the EPA Water Quality Analysis Simulation Program (WASP), QUAL2, and BASINS. In some other cases, modeling can involve developing innovative stochastic models to evaluate the probability or risk of loadings, and exceeding target loadings and water quality standards in priority water bodies to support TMDL development. It is also often useful to link these models with GIS to develop automatic spatial analysis and modeling capabilities.

Some minimum level of data will be needed to generate a TMDL number from the model that is used. The higher the level of quantification of the data being used in the model, the more accurate the resulting output will be. This translates into greater certainty in the specific actions needed to be taken in the implementation plan to achieve the needed water quality improvements.

By contrast, when the quantification is subject to considerable uncertainty, the types of actions associated with implementation measures to meet the TMDL number are less defined. This results in using an iterative or phased approach in the plan of implementation. If there is relatively less rigor in quantifying the desired endpoint of a specific action that is a component of the watershed management plan and/or TMDL, more specificity or rigor is necessary in the implementation plan and follow-up monitoring and assessment of effectiveness of that component. A reasonable degree of quantitative rigor is necessary to support a finding that the implementation of a component of a watershed management plan and/or TMDL will lead to attainment and that progress can be measured.

References: For references see Table 2 and contacts for project numbers 7, 9, 10, 11, and 14.

Staff Qualifications: Table 3 lists the educational background and experience of 20 professionals that were hand picked to work on this contract and to provide support services and technical expertise. Additional personnel are available on as needed basis and costs for these staff are included in Section 5.0 Cost Proposal. For the 20 selected staff, natural science degrees are 75 percent of the pool, engineering degrees are 20 percent, and the remaining 5 percent is a Ph.D. mathematician included on the team for statistical analysis. All of the staff in Table 3 may work on this service area; however, primary staff members for this service area are listed in Table 7.

Company Profile and Experience: Stillwater Sciences will lead this service area with help from KirK Environmental, LLC. Both firms, and especially Stillwater Sciences have excellent modeling experience (Table 2) and skills (Table 3). Example modeling projects lead by Stillwater Sciences include project numbers 7, 9, 10, 11, and 14 in Table 2.

Table 7. Professional Staff for Modeling Services 12
(See also Figure 1 Team Organization Chart & Table 3)

Staff (See Table 3 for Experience)	Yes	No
1. Steve MacNeill **- *PM***	**XXX**	
2. Scott Payne - *Technical Support*	**XXX**	
3. Randy Huffsmith,		**XXX**
4. Ian Magruder **-** GIS Support	**X**	
5. Rick Tilstra		**XXX**
6. Brandy Moses	**X**	
7. Phil Peterson - **Lead Service Area 12**	**XXX**	
8. Steve Ralph - **Lead Service Area 12**	**XXX**	
9. Noah Hume - *Technical Support*	**XXX**	
10. Shawn White - *Technical Support*	**XXX**	

Staff (See Table 3 for Experience)	Yes	No
11. Maia Fleming-Singer - *Technical Support*	**XXX**	
12. Peter Baker - *Technical Support*	**XXX**	
13. David Zajanc - *Technical Support*	**XXX**	
14. Carl Bolstad - *Technical Support*	**XXX**	
15. Rafael Real de Asus - *Technical Support*	**XXX**	
16. Todd Hoitsma		**XXX**
17. Wease Bollman		**XXX**
18. Loren Balhs		**XXX**
19. Nick Hoyrup		**XXX**
20. Ann Schwend		**XXX**

(XXX = key professional & X = support services if needed)

Example company experience include Stillwater Sciences efforts to develop the *Road Sediment Model* (RSM), a desktop application and monitoring program to estimate the amount of fine sediment that enters the stream channel network from forest road systems. The model is being specifically developed for the Green Diamond Resource Company (formerly Simpson Resource Company) land base on the Olympic Peninsula in Washington State. The RSM will track estimates of past sediment delivery using actual rainfall and management activity data, and also forecast future sediment delivery quantities under planned management and hypothetical weather scenarios. The RSM will be a GIS model driven by data that represents the actual conditions on the land base. The RSM will calculate water runoff volumes and sediment concentrations from empirically derived relationships between rainfall, runoff, traffic and sediment.

The RSM can assist forest managers in harvest planning by allowing comparison between future scenarios and estimated total sediment delivered the current year. Forest managers will have the tools to make informed decisions regarding hauling under certain weather conditions potentially optimizing the number of operating days and the sediment load allocation on an annual basis. The estimates will serve to meet the State and Federal requirements for minimizing sediment delivery and measuring delivery against a TMDL.

Method of Providing Service and Quality Assurance: The RSM is being developed in accordance with Stillwater Sciences' proven approach for producing high quality science products efficiently and cost effectively. The RSM was developed based on a thorough literature review. The seminal paper titled "Sediment Production from Forest Road Surfaces" by Leslie M. Reid and Thomas Dunne (1984) provided much of the inspiration for the RSM, as it established the relative significance of road characteristics, traffic, and rainfall in sediment delivery, as well as a basic methodology for expanding the work. Stillwater staff greatly expanded the utility of this research by linking it to the client's geographic information system that incorporated data on roads, streams, harvest activities, road inventories, and from rain gauges. The combination of these components resulted in development of a desktop application to aid land managers in harvest planning and TMDL compliance.

With a scientific framework in place, Stillwater staff developed improvements to the methodology using newer technologies that provided more accurate data and lower labor costs.

To bring the research together in a useable product, Stillwater Sciences followed established software development processes. GIS data first had to be reviewed and the exact requirements ascertained. After the project specific requirements were defined, GIS staff initiated a development cycle that allowed the client to keep abreast of progress and provide periodic feedback ensuring that the original requirements were being met. As the project continues, a parallel process of testing and validation will be used during and after product development. After delivery, Stillwater staff will continue to work with the client to field-test the product.

Stillwater staff (then working for Simpson Resource Co.) placed rain gauges in a representative center of each of the five areas defined to be geologically and topographically unique ("Lithotopo Units"), in the client HCP area. Beginning October 2002, the team installed capacitance rods at culvert inlets to continuously record

water depth. During discrete storm events, the discharge of water from that road and its known catchment area was recorded at the culvert outlet and related to water depth. Water samples were taken to determine the concentration of sediment in the water. In order to capture the traffic variable, active logging areas along with non-active locations were sampled. So far, data has been recorded for 12 road segments and approximately 40 to 60 discrete storms. Data collection under this process will be ongoing and in 2004 shift to other parts of the ownership. With these relationships established, it will be possible to model per-unit area runoff rates and sediment quantities based on a given rainfall record, by road type and traffic pattern.

Functional capabilities:

- The model will be able to estimate and track past sediment delivery quantities based on known harvest activities, recorded rainfall record, and road inventories.
- The model will be able to estimate future sediment delivery, based on planned harvest activities, predicted typical rainfall, and predicted road attributes (remediation work).
- The model will be able to save previously created “runs” so that comparisons can be made between various harvest and haul scenarios.
- The model will be able to estimate haul routes only based on a harvest unit origin and ultimate delivery location.
- The model will be able to have multiple haul routes for each harvest activity, and will be able to specify the lifetime of such haul routes.
- The user will be able to edit model generated haul routes.
- The model will estimate the number of loads coming out of each harvest unit based on recorded harvest volumes.
- The model will provide reporting that compares past and future estimates with TMDL budgets.

Non-functional capabilities:

- The model takes advantage of the client’s existing GIS, operating systems, and database platforms.
- The model will be extremely easy to use.

Solutions provided from the model:

- Harvest activity archives and projections will be obtained from existing client harvest planning application data. Future log management systems may provide better data on actual number of loads delivered per harvest unit.
- Rainfall records will be downloaded from rain gauges by field crews and uploaded into the model periodically. Future rainfall scenarios will be modeled using historical averages for unique areas of the client land base.
- Every estimate will be associated with a model run and stored permanently on the client database for future retrieval and comparison.
- Haul routes will be derived using a specially tailored shortest-path algorithm and a weighted geometric road network.
- In order to meld with the client platforms accordingly, Stillwater staff chose to use the ESRI GIS programming library, ArcObjects along with Microsoft Visual Studio .NET to develop the application. The client currently runs ArcGIS 8.3 with ArcSDE installed on SQL Server 2000 backend. RSM intermediate and long term storage will therefore also be stored on the database.
- The client and Stillwater chose to create a standalone GUI rather than an extension to ArcMap because of its flexibility and capacity to be tailored specifically to process of tracking and predicting sediment.

Timeline: Field work for the RSM began in the fall of 2002 and is ongoing. Continuous monitoring is recommended as it can improve the model inputs over time. Application development began in April 2004 and is planned to be delivered by September 2004.

The application feature set as previously described represents the most cost efficient initial implementation of the RSM concept. However, Stillwater Sciences recognizes huge potential for future versions. Vast improvements in model accuracy could be obtained by increasing the spatial and temporal resolution of the input data. For example, by integrating real-time weather data into the model or by tracking harvest and other management activities more accurately we could potentially model specific traffic events intersecting with

delivery points on the road network. Stillwater Sciences anticipates developing these features after version 1.0 is complete.
In addition to standard software packages, Stillwater Sciences utilizes an assortment of specific software programs and models used for environmental analysis. These software programs include the following:

- Stillwater maintains a spreadsheet based **Fish Population Program** that has been used for analysis of one client's fish population information since the mid-1980s.

- Stillwater developed the **BasinTemp©** model, which predicts stream temperatures using digital topography and vegetation data. The model was developed to fill needs that are not met by existing basin-scale models which have considerable data input and computer processing requirements. The model is primarily intended for stream temperature predictions during the summer months when peak stream temperatures have the greatest impact on biotic populations. BasinTemp© enables the user to analyze the role of riparian vegetation on stream temperature at the individual reach-scale, and the cumulative effects of riparian vegetation on downstream temperatures. One of BasinTemp©'s strengths is that it allows the user to adjust riparian tree heights according to different criteria and assess the resulting impact on stream temperatures. Basin Temp© has simple input and data requirements, which allows it to be applied quickly and efficiently in large basins.

- **PHABSIM** (Physical Habitat Simulation) programs are available for use with instream flow studies. These programs allow a variety of hydraulic modeling options, including the IFG 4 and WSP programs. The PHABSIM model also includes HABTAT and HABTAV, the software programs for compiling fish habitat results associated with instream flow studies.

- **SNTEMP** and **SSTEMP** programs are used for modeling stream network and stream segment water temperatures. These programs were developed by the USFWS for use in a variety of riverine water temperature modeling conditions. SSTEMP was used for the temperature modeling of Lost Creek.

- **S-Plus** is used for complicated statistical analyses, while **Microsoft Excel** provides the capability for simpler analyses, and **SIR 2000** provides database support capability. Special-purpose modeling software is also available as needed, such as **DISTANCE** population density estimation software.

- Stillwater's **Geographic Information System** (GIS) software solutions include the ESRI suite of GIS products ported to both UNIX workstation and PC platforms. We operate ArcInfo, version 8.02 on a Sun Ultra 2, running SunOS 5.7. Several PC's are equipped with ArcView version 3.2, and are networked together to permit file and theme sharing. In addition, our collaboration with U.C. Berkeley's Department of Earth and Planetary Science provides access to additional GIS and remote sensing software, including ENVI/IDL, Splus SpatialStats - a geostatistical package which integrates directly with ArcInfo, Surfer, RiverTools, and MicroImages TNTmips.

Stillwater has developed several sediment transport models in support of river restoration projects, including:

- **EASI** model: a reach scale gravel transport model in support of river restoration activities such as gravel augmentation, channel design and flow alteration;

- **HatSand** model: developed specifically for two short sand bed reaches at the Hat Creek, California;

- **Sand transport model:** for evaluation of sand transport upon the removal of Soda Springs Dam, North Umpqua River, Oregon;

- **Gravel transport model:** for evaluation of gravel transport upon the removal of Marmot Dam, Sandy River, Oregon;

- **Sand transport model : (**dependent on result of a gravel transport model) for evaluation of sand transport upon the removal of Marmot Dam, Sandy River;

- **OkFly model**: (developed while Yantao Cui of Stillwater was at the University of Minnesota) for evaluation of sedimentation, floodplain inundation and deposition in the Ok Tedi - Fly River system due to mining operation, Papua New Guinea

Stillwater is also developing, under a contract with NASA, a **basin scale gravel transport model** for use in mountain river systems. The model is currently in the testing phase.
For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

4.1.5 Statistical Analysis - Support Service 13

Statistical analysis of large data sets is often required for a range of purposes including summarizing data, determining trends, and making comparisons. It can also involve developing statistical and stochastic methods that are linked to deterministic water quality models, or are add-ins to other software packages, such as *Excel*, that are user friendly and applicable to a wide range of water quality monitoring and assessment issues.

References: For references see Table 2 and contacts for project numbers 8, 9, 12, and 16 and limited statistical analysis in project number 2.

Staff Qualifications: Table 3 lists the educational background and experience of 20 professionals that were hand picked to work on this contract and to provide support services and technical expertise. Additional personnel are available on as needed basis and costs for these staff are included in Section 5.0 Cost Proposal. For the 20 selected staff, natural science degrees are 75 percent of the pool, engineering degrees are 20 percent, and the remaining 5 percent is a Ph.D. mathematician included on the team for statistical analysis. All of the staff in Table 3 may work on this service area; however, primary staff members for this service area are listed in Table 8.

Company Profile and Experience: Stillwater Sciences will lead this service area. Stillwater Sciences has excellent statistical analysis experience (Table 2) and skills (Table 3). Example projects lead by Stillwater Sciences include project numbers 8, 9, 12, and 16 in Table 2. Limited statistical analysis was also performed by KirK Environmental, LLC on project 2.

Table 8. Professional Staff for Statistical Analysis Services 13
(See also Figure 1 Team Organization Chart & Table 3)

Staff (See Table 3 for Experience)	Yes	No
1. Steve MacNeill ***- PM***	**XXX**	
2. Scott Payne	**X**	
3. Randy Huffsmith,		**XXX**
4. Ian Magruder **-** GIS Support	**X**	
5. Rick Tilstra		**XXX**
6. Brandy Moses	**X**	
7. Phil Peterson - *Technical Support*	**XXX**	
8. Steve Ralph - *Technical Support*	**XXX**	
9. Noah Hume	**X**	
10. Shawn White	**X**	
11. Maia Fleming-Singer	**X**	
12. Peter Baker - **Lead Service Area 13**	**XXX**	
13. David Zajanc - *Technical Support*	**XXX**	
14. Carl Bolstad		**XXX**
15. Rafael Real de Asus		**XXX**

Staff (See Table 3 for Experience)	Yes	No
16. Todd Hoitsma		**XXX**
17. Wease Bollman		**XXX**
18. Loren Balhs		**XXX**
19. Nick Hoyrup		**XXX**
20. Ann Schwend		**XXX**

(XXX = key professional & X = support services if needed)

Example experience includes Stillwater Sciences long term comprehensive research program investigating the ecology of fall-run Chinook salmon in the Tuolumne River downstream of New Don Pedro Dam. To develop a cost-effective salmon enhancement program for Turlock and Modesto Irrigation Districts, a number of statistical modeling tools have been employed to guide the design of restoration projects as well as to assess project benefits after completion. In addition to peer review by academic experts, experimental designs and results for each of the studies have been reviewed by members of the Tuolumne River Technical Advisory Committee.

Method of Providing Service and Quality Assurance: Using an adaptive management approach, the coupling of physical models with statistical and biological models has the advantage that biological implications of various management actions can be more easily understood (e.g., long-term effects on average population size). After reviewing project hypotheses and model simulation of a number of potential scenarios, pilot project implementation allow testing and refinement of the overall restoration strategy.

Recognizing that many species employ a variety of life-history strategies in response to environmental conditions, salmonid life history can be viewed as the selection and use of a sequence of habitats with favorable spatial-temporal distributions (i.e., habitats available to the organism at the appropriate time and place). In addition to a number of field based studies on the Tuolumne River, Stillwater Sciences employed bedload transport results in transport modeling, survival to emergence results, and population and individual based models to determine the effectiveness of an overall sediment management program:

- **EASI (Enhanced Acronym Series 1 & 2 with Interface) sediment transport model**. The EASI model is an implementation of the surface based bedload transport equation of Parker (1990), modified to apply to natural gravel bedded rivers. The model calculates sediment transport capacity for a given cross section, friction slope, water discharge, and bedload grain size distribution. The sediment transport capacity is the maximum possible sediment transport rate in the reach in the case of unlimited sediment supply. The model results were validated by empirical tests to determine whether the river was supply-limited, in which case the actual sediment transport rate in the river reach is smaller than the model-calculated transport capacity. The model was also used to determine the mobility and transport rates of various gravel size distributions for planned gravel augmentation projects.

- ***Escape 4* individual based model**. To assess the effects of gravel augmentation strategies developed from sediment transport modeling, Stillwater Sciences employed an individual-based mode, *escape4*, originally developed to assess density dependent mortality effects on the Tuolumne River Chinook salmon due to redd superimposition. Individual based models build upon habitat-based approaches by tracking individual organisms and their behavior. Ideally, fish habitat preferences and individual decisions are based on mechanistic information or observations to develop rules for spawning, feeding, predator avoidance, and movement. Using assumptions related top the size of a typical redd, the fraction of mapped gravels which salmon will deem usable, etc., the model was used to determine the form of stock-production relationships for use in population models.

- **The Simulation Model.** The simulation or EACH population model is a deterministic simulation model for San Joaquin Basin Chinook salmon populations. The main objective of this model was to identify factors having the greatest influence on the salmon population and to assess the relative importance of these factors. On the Tuolumne River, the *Escape 4* model, discussed above and the EACH model were used to predict the population benefits of increasing spawning habitat area under various coarse sediment augmentation scenarios. In general, population models are not well suited to determining the effects of incremental habitat modifications; the required resolution is obtained by factoring the empirical escapement-to-recruitment relationship into lifestage-to-lifestage relationships, until it is possible to make

reasonable predictions about the effects of a proposed management action on one or more of these relationships. The most significant of these related to spawning and egg-to-alevin survival, which were then propagated forward through the life history to determine the implications of the action for overall population levels. Results of these simulations were used to determine the population level effects of various fine sediment control measures as well as the effectiveness of gravel cleaning on survival to emergence.

For Quality Assurance see Section 4.1.9.

Timeline: Originally completed in the 1990s, the modeling tools discussed above have been updated and calibrated for a number of project related to coarse and fine sediment management on the lower Tuolumne River. Periodic updates of the models ensure that they accurately reflect conditions as habitat enhancements are implemented, whereas historical calibrations can be used to determine whether the observed results of planned management actions produce expected results.

4.1.6 DEQ Electronic Data - Service Area 15

References: For references see Table 2 and contacts for project numbers 2, 3, 4, and 5.

Staff Qualifications: Table 3 lists the educational background and experience of 20 professionals that were hand picked to work on this contract and to provide support services and technical expertise. Additional personnel are available on as needed basis and costs for these staff are included in Section 5.0 Cost Proposal. For the 20 selected staff, natural science degrees are 75 percent of the pool, engineering degrees are 20 percent, and the remaining 5 percent is a Ph.D. mathematician included on the team for statistical analysis. All of the staff in Table 3 may work on this service area; however, primary staff members for this service area are listed in Table 9 on the next page.

Table 9 Professional Staff for DEQ Electronic Data Service Area 15
(See also Figure 1 Team Organization Chart & Table 3)

Staff (See Table 3 for Experience)	Yes	No
1. Steve MacNeill - ***PM***	**XXX**	
2. Scott Payne	**X**	
3. Randy Huffsmith		**XXX**
4. Ian Magruder **- Service Area Lead**	**XXX**	
5. Rick Tilstra		**XXX**
6. Brandy Moses - *Support*	**XXX**	
7. Phil Peterson	**X**	
8. Steve Ralph		**XXX**
9. Noah Hume		**XXX**
10. Shawn White		**XXX**
11. Maia Fleming-Singer		**XXX**
12. Peter Baker		**XXX**
13. David Zajanc		**XXX**
14. Carl Bolstad		**XXX**
15. Rafael Real de Asus		**XXX**
16. Todd Hoitsma - *Fieldwork Support*		**XXX**
17. Wease Bollman - *Analysis*		**XXX**
18. Loren Balhs - *Analysis*		**XXX**
19. Nick Hoyrup		**XXX**
20. Ann Schwend		**XXX**

(XXX = key professional & X = support services if needed)

Company Profile and Experience: The KirK team has excellent capacity and experience to propose, set up, and monitor natural resource as discussed in Section 4.1.1. KirK Environmental, LLC will lead this service area and has excellent skill for electronic data input as supported in Table 2 project number 2 through 5.

Method of Providing Service and Quality Assurance: Chemical, physical, and biological data are collected to support watershed assessments. KirK understands that water quality data provided by analytical laboratories will be provided by the laboratory per the specification outlined in the RFP. The KirK team will not provide electronic data / information related to water quality data unless requested or historic data are critical to watershed monitoring. However, other data such as riparian assessment and channel substrate inventories can and may be requested in the mandated DEQ electronic format. To this end, KirK has developed a GIS interface approach using Excel for GIS attributed data that can be converted to the Electronic Data Deliverable (EDD) standard for Storet/Storet Import Model (SIM). This service will be provided if requested by DEQ for efforts completed in Service Areas 1 through 3 described in Section 4.1.1.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

4.1.7 Heavy Equipment and Revegetation - Service Areas 16 and 17

Heavy equipment and revegetation services are combined in this section based on both requiring equipment and because the services are typically combined to restore waterways.

References: For references see Table 2 and contacts for project numbers 19, 22 (two references), and the following additional references for Second Nature Landscape and Design:

John and Lois Lounsbury
P.O. Box 334
Mcallister, MT 59740
406-682-2339

Steve & Judy Parks
P.O. Box 624
Sheridan, MT 59749
406-842-7272

Bill and & Elizabeth Childrey
Glen, MT 59732
406-835-2093

Staff Qualifications: Table 3 lists the educational background and experience of 20 professionals that were hand picked to work on this contract and to provide support services and technical expertise. Additional personnel are available on a as needed basis and costs for these staff are included in Section 5.0 Cost Proposal. For the 20 selected staff, natural science degrees are 75 percent of the pool, engineering degrees are 20 percent, and the remaining 5 percent is a Ph.D. mathematician included on the team for statistical analysis. The revegetation firm (Hoitsma Ecological Inc and ADC Native Plant Nursery) and the heavy equipment construction firm (Second Nature Landscape and Design) lead staff all have natural resource backgrounds and 4-year or graduate level degrees as shown in Table 3. Staff members for this service area are listed in Table 10.

Company Profile and Experience: The KirK team has excellent capacity and experience to support all aspects of revegetation and heavy construction activities. Example projects include 19 and 22 in Table 2 and project 3 for Spring Creek. Hoitsma Ecological Inc. (with ADC Native Plant Nursery) will lead the revegetation

service area with help from KirK Environmental, LLC and Second Nature Landscape and Design will lead the heavy equipment and construction service area with help from KirK Environmental, LLC. All three firms have excellent skills and experience designing revegetation projects and overseeing / implementing construction activities in or near water (Table 2 and Table 3).

Method of Providing Service and Quality Assurance: The Kirk Environmental team will utilize Todd Hoitsma as the lead planner and coordinator on all revegetation related issues, as he is intimately familiar with Montana native plants and a wide array of revegetation suppliers, techniques and contractors. Todd will use Aquatic Design and Construction Native Plant Nursery as the primary supplier of any native plants and related revegetation labor, and materials that may be required on a specific project. For small jobs in more distant parts of the state, a host of local native plant nurseries may be subcontracted. The list below summarizes revegetation our team can provide.

Services Provided
Native woody/herbaceous plant supply
Contract-growing of native plants
On-site seed collection
Mychorrhizal inoculation
High impact/low cost willow plantings
Weed control
Pre-vegetated erosion control fabric supply
Large- or small-scale willow harvest
Mature plant salvage (e.g. riparian shrubs)
Broadcast/drill seeding
Hydroseeding
Revegetation planting labor/crews
Erosion control fabric selection/supply
Erosion control fabric installation
Revegetation supervision
Development of river-based monitoring plans

Table 10. Professional Staff Revegetation and Heavy Equipment Services 16 & 17
(See also Figure 1 Team Organization Chart & Table 3)

Staff (See Table 3 for Experience)	Yes	No
1. Steve MacNeill ***- PM***	**XXX**	
2. Scott Payne	**X**	
3. Randy Huffsmith - *Technical Support*	**XXX**	
4. Ian Magruder	**X**	
5. Rick Tilstra	**X**	**XXX**
6. Brandy Moses		**XXX**
7. Phil Peterson		**XXX**
8. Steve Ralph		**XXX**
9. Noah Hume		**XXX**
10. Shawn White		**XXX**
11. Maia Fleming-Singer		**XXX**
12. Peter Baker		**XXX**
13. David Zajanc		**XXX**
14. Carl Bolstad		**XXX**
15. Rafael Real de Asus		**XXX**
16. Todd Hoitsma ***- Lead Area 17***	**XXX**	
17. Wease Bollman		**XXX**
18. Loren Balhs		**XXX**
19. Nick Hoyrup		**XXX**

Staff (See Table 3 for Experience)	Yes	No
20. Ann Schwend ***- Lead Area 18***	**XXX**	**XXX**

(XXX = key professional & X = support services if needed)

The Aquatic Design and Construction Native Plant Nursery: As the primary supplier of any nursery-grown plants for our projects, Aquatic Design and Construction Native Plant Native Plant Nursery (ADC Nursery) has been growing native upland and wetland plants in Livingston, MT the for three years. ADC maintains approximately 4,000 ft^2 of climate-controlled greenhouses and over four acres of outside growing area. Facilities include full-spectrum grow lights and a heating system for winter propagation of native plants

Their greenhouse operation maintains site-adapted inventory for areas within south central and southwestern Montana. We also provide contract-growing services for sites within the Rocky Mountain Region, as well as relationships with a number of smaller nurseries throughout the state. The ADC nursery services includes: harvest of native seed, collection of native stock, growing plants to requested specifications, hardening-off and delivering plants to a project site. They also produce pre-vegetated coir fabric for areas of high potential erosion and where a rapid “green-up” is desired.

Recent ADC projects include comprehensive revegetation services including planting design, growing, implementation and placement. This process includes planting, seeding, fertilizing, mychorrizal inoculation, on-site plant growing and staging, and monitoring.

Their team of growers and planters can get the project done on time, and on budget. As needed ADC can obtain plant materials through and by an in-house staff of collectors and plant taxonomy specialists seed and other regional sources.

For heavy construction related to, for example new stream corridor construction, wetlands rehabilitation, or channel enhancement, Second Nature Landscape and Design will be utilized. Ann Schwend, a land rehabilitation expert and her husband Ron Schwend will lead these efforts with oversight from Randy Huffsmith, P.E. of KirK Environmental, LLC. The construction firm mostly works on large scale landscape construction in Western Montana including stream restoration and construction, pond construction, channel construction for fishery develop and enhancement, and wetlands restoration. Second Nature Landscape and Design, Inc. has over five full time employees and equipment operators, and is a licensed and bonded construction firm. The owners retain technical education and experience in environmental engineering and plant and soil sciences emphasizing land rehabilitation / restoration. The company owns both large and small construction equipment and they are well versed with working with landowners and conservation districts on restoration and construction projects. Ann Schwend is a supervisor on the Ruby Valley Conservation District. Lastly, the owners of Second Nature Landscape and Design, Inc. are well acquainted with permitting requirements in and around water. They have worked through the stream permitting process and for ACE 404 permits, 310 permits, and various MDEQ and DNRC water quality and water right permits many times.

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

4.1.8 Watershed Coordination, Communication/Education, Land Use Planning, Technical Manuals - Service Area 18 through 23

Service areas 18 through 23 are combined in this section for watershed coordination, watershed communication/education, land use planning, and technical manuals. These services are combined based on KirK Environmental, LLC’s understanding of watersheds in Montana, group process, outreach needs, and the holistic services required to improve / protect natural resources, work with watershed residents, agency representatives, and stakeholders, and become better land stewards through application of BMPs.

References: For references see Table 2 and contacts for project numbers 2, 4, 5, 6, and 23.

Staff Qualifications: Table 3 lists the educational background and experience of 20 professionals that were hand picked to work on this contract and to provide support services and technical expertise. Additional personnel are available on an as needed basis, and costs for these staff members are included in Section 5.0 Cost Proposal. For the 20 selected staff, natural science degrees represent 75 percent of the pool, engineering degrees make up 20 percent, and the remaining 5 percent is a Ph.D. mathematician included on the team for statistical analysis. Primary staff members for this service area are listed in Table 11.

Table 11. Professional Staff for Watershed, Communication, Education, Administration, Technical editing, Land Use Planning, and Manual Services 18 through 23
(See also Figure 1 Team Organization Chart & Table 3)

Staff (See Table 3 for Experience)	Yes	No
1. Steve MacNeill - ***PM***	**XXX**	
2. Scott Payne - *Lead Service Areas 19 - 21 and Technical Support*	**XXX**	
3. Randy Huffsmith - Lead Service Areas 22 and 23	**XXX**	
4. Ian Magruder - *Support*	**XXX**	
5. Rick Tilstra- *Support*	**XXX**	
6. Brandy Moses - *Support*	**XXX**	
7. Phil Peterson		**XXX**
8. Steve Ralph		**XXX**
9. Noah Hume		**XXX**
10. Shawn White		**XXX**
11. Maia Fleming-Singer		**XXX**
12. Peter Baker		**XXX**
13. David Zajanc		**XXX**
14. Carl Bolstad		**XXX**
15. Rafael Real de Asus		**XXX**
16. Todd Hoitsma		**XXX**
17. Wease Bollman		**XXX**
18. Loren Bahls		**XXX**
19. Nick Hoyrup - *Lead Service Area 18*	**XXX**	
20. Ann Schwend		**XXX**

(XXX = key professional & X = support services if needed)

Company Profile and Experience: The KirK team has excellent capacity and experience to provide a variety of watershed support services, land use planning, and technical editing / manual preparation. As outlined in Table 2, KirK Environmental, LLC and Nick Hoyrup have impressive credentials, experience, and working knowledge of watershed support services that are combined in this section. Specific expertise includes:

- Combined watershed coordination experience in 10 TMDL planning areas
- On-the-ground experience working information and education NPS projects
- Contract administration on dozens of federal, state, and private foundation grants
- Montana TMDL writing experience and information transfer
- Land use planning on watershed scale applicable to agricultural irrigation and soils
- Staff experience writing BMP manuals for sediment reduction

KirK Environmental, LLC will lead all of these service areas except Service Area 18, which will be lead by Nick Hoyrup. Both firms have excellent experience (Table 2) and skills (Table 3) for providing these services.

In general, KirK Environmental, LLC has been a major player in setting the standard in Montana for watershed support services, innovate solutions for action, and excellence. Working with affected communities within a watershed and their associated interest groups, KirK identifies concerns, compiles and analyzes data, prioritizes challenges, determines critical areas, establishes objectives, selects monitoring locations, and develops implementation plans that cost-effectively and holistically assess the water quality in the watershed.

Method of Providing Service and Quality Assurance: Outlines for the service areas 18 through 23 are summarized below:

Watershed Coordination: Watershed coordination begins with the local entity and support group seeking more involvement in water quality and related natural resource issues. Nick Hoyrup will provide these services with assistance from Rick Tilstra and Brandy Moses from KirK Environmental, LLC. Scott Payne will assist as needed in technical support and has significant watershed coordination experience across Montana. Mr. Hoyrup is currently the coordinator for the Beaverhead Watershed Committee and works with the entire group in meetings leading discussions to one-one meetings with landowner in the Watershed. Mr. Hoyrup will apply his skills picked working in the Beaverhead and apply them to new areas when requested. Rick Tilstra is the coordinator for the Ruby Watershed and can provide fill in or support services if needed, such a fund raising, as well as Brandy Moses. Scott Payne has secured over $4,000,000 in grants from variety of sources for watershed groups and slated to assist Mr. Hoyrup to retain implementation funding.

Information and Education: Information and education is cornerstone of any watershed effort and forms the working knowledge local develop for watershed issues. Depending on the resource issue and specifics surrounding why there are water quality or natural resources impacts to the fishery, wildlife, stream flow, or other resource, information and education services need to be tailored to these needs. KirK Environmental, LLC has provided these services to the Flathead Basin Commission planning and implementing riparian buffer demonstration sites, building kiosks, and education material. KirK Environmental, LLC will help out client identify the critical education and outreach needs in their watershed, identify partnering entities to help support and implement the work, and fund raise to changes ideas into reality.

Contract Administration: KirK Environmental, LLC has managed, administered and prepared grant reports for millions of dollars in grant funding. Excellence in administration is linked to paying attention to detail, knowing how to take advantage of spreadsheets for cost tracking, understanding the grant funding source reporting requirements, clearly defining the scope of work and tasks outlined to complete the scope of work. Also it involves tracking matching funds, which KirK Environmental, LLC has provided on a regular basis for several watershed groups outlined in the reference section above. Lastly, contract administration means you also have to have working knowledge of the Montana procurement laws and how to best serve your client to minimize costs yet make sure the procurement of the mandated requirements is met.

Information Transfer and TMDL Editing: KirK Environmental, LLC has promoted, set up, and facilitated dozens of public meetings and announced the availability of key watershed documents. We have a working knowledge of who to contact to get public service announcements and articles published if there is a need for more attention. KirK Environmental, LLC is in the process of getting a video prepared, setup, and monitored technical work shops, conducted a multitude of field trips, prepared news letters and pamphlets, and also provided high quality editorial support services through Brandy Moses and Steve MacNeill in the Helena office. Both of these staff members are ideal for TMDL technical editing services to identify grammar and mathematical errors, document clarity, and linkage between sections. Lastly, KirK Environmental, LLC has web design support services through Brandy Moses.

Land Use Planning: KirK has provided agricultural land use planning based on watershed assessments and consideration of future desired conditions that are supported by local residents, stakeholders, and agency representatives. Chemical, physical, and biologic data are useful to identify watershed stressors from which it is possible to recommend land use changes that improve or protect watershed resources. In the Ruby Watershed, land use changes include organizing how irrigation water is conveyed and applied to the ground to conserve Ruby River and tributary stream flows, recommendations regarding how fertilizers are applied to soil to limit nitrate loading, and establishment of grazing management plans to protect water quality and riparian corridors. For the East Valley project in the Upper Clark Fork River Basin, off-stream water coupled with a rest-

rotation grazing plan is a key land use change needed to protect water quality and address aquatic life impairment issues. Also, KirK Environmental, LLC has conservation easements as way to protect land use and open space, and limit future development. Randy Huffsmith, P.E. is leading this service area and will apply his water resource engineering background to provide land use planning services. Scott Payne will assist in the service area.

Technical Manuals or Circulars: KirK will provide clear and concise documentation for technical manuals and circulars as requested by the MDEQ or other contract end users. Randy Huffsmith, P.E. is leading this service area and will apply the same approach used to prepare the MDEQ road BMP guide for Montana. As a primary contributor to the BMP guide, Mr. Huffsmith has a keen sense for how to organize, develop, and support technical manual. He also understands the need to write the audience readers and their ability to use and apply the technical information. Brandy Moses and Steve MacNeill will assist in Service Area as contributing authors

For Quality Assurance see Section 4.1.9.

Timeframe: Table 2 lists the start and completion dates for example projects. As for future support services and timeframes for this service area, the KirK team is available to respond quickly and responsively to DEQ and other agency / contract user timeframes. Our staff and resources are large enough and diverse enough to take on aggressive or relaxed timeframes to complete the proposed project and meet client expectations.

4.1.9 Quality Assurance

Quality assurance is top priority. Quality assurance and contracted support services relate to more than water quality data collection and analysis, which most think of when discussing quality assurance. Quality assurance covers a broad spectrum linked to all data collection, document preparation, schedule, costs, and employee attitude.

First, the KirK team technical proposal integrates eight key elements that are needed to realize the project goals and operate within the budgets as part of our quality assurance system. These requirements include:

1) Maintaining partnerships along with regular and candid communication
2) Strong mapping, GPS, and GIS database support services and oversight and cross referencing
3) Consistent, uniform, and standard data collection and assessment methods
4) Economical, repeatable, statistically reliable, and technically accurate field methods (Standard Operating Procedures (SOP) on file at the MDEQ web site)
5) Objective analysis of existing data and new data collected as well as peer review of the results
6) Identifying key management strategies to balance goals and objectives
7) Keeping stakeholders involved during development, assessment, and planning
8) Senior management taking responsibility for schedules, deliverable quality, and technical accuracy and precision.

Our mission requires commitment to project quality in all of our assignments. KirK's quality management program is our way of doing business—a structured approach to improvement based on client satisfaction. It is also used to measure whether we achieve our firm's improvement goals. Our quality management program is geared to improve:

- Quality of services
- Staff capability
- Health and safety
- Productivity

Senior Management: KirK is well known in Montana for providing excellent project managers. Our project managers are trained to provide effective and efficient services to clients including:

- Maintaining clear channels of communication between the client and the project team by providing a single point of responsibility
- Providing appropriate, regular reporting from the project team to our client

- Maintaining direct lines of responsibility within the project team for the various work components
- Ensuring timely completion of the work according to an established schedule of activities
- Keeping the project costs within the budget
- Providing regular checks on project controls

Our project manager, Mr. Steve MacNeill will lead the KirK team. Mr. MacNeill has served as project manager on a variety of planning, design, and construction projects related to watersheds and TMDL development. Many of these assignments were complex, multidisciplinary projects involving close coordination and communication with regulators and community stakeholders. Additionally, as a corporate officer, Mr. MacNeill can expedite and facilitate the allocation of company resources—staff or other—on a site-wide basis to ensure timely and cost-effective project deliverables. He is authorized to initiate and conduct work assignments and will work directly with Mr. Randy Huffsmith and Scott Payne of KirK Environmental, LLC to ensure peer review of the project approach, deliverable quality, schedule, and costs.

Also to maintain high quality services, Mr. MacNeill will manage the work effort for DEQ by communicating with the agency project contact on a regular basis. His chief responsibilities will involve developing level-of-effort requests and final scopes of service, assigning the proper staff to a task based on the recommendations of the task leaders, and coordinating the resolution of technical issues. He will oversee communications regarding budget, scope, and schedule, and will be in charge of the coordination of community relations/stakeholder involvement required.

Service Area Leader Role. Each task leader will be responsible for the successful completion of his or her task in the development of projects for DEQ or other contract end user. Their chief responsibilities will involve preparing work plans and implementing project activities including budgets, schedules, technical project activities, and, as necessary, special reports or corrective actions. Mr. MacNeill with work with each of the Service Area Leaders identified in the organization chart (Figure 1).

Technical Advisor Role. The responsibilities of the technical advisors will involve assessing the adequacy and soundness of conclusions, including implementability factors, thoroughness and level of detail of the regulatory review for both existing and anticipated regulations, the appropriate application of existing and new technology, if applicable, and the use of sound, practical, and cost-effective engineering approaches to problem-solving. Mr. Scott Payne and Mr. Randy Huffsmith will provide these services.

Relationship with the DEQ. Mr. MacNeill will serve as the primary liaison with DEQ. He, or one or more of the task leaders, will attend DEQ meetings and will manage the completion of all services required by the department.
KIRK sees its strategic relationship with DEQ as involving the following:
- Developing and implementing projects that will have a significant impact on the water quality of the priority watersheds
- Providing proven international experience for watershed water quality issues
- Technical support and regulatory compliance
- Developing QA/QC plans for each chemical, physical, and biological assessment task order and also for modeling support services
- A contact quality assurance management can be prepared upon request following award per EPA requirement for Quality Management Plan EPA QA/R-2 (2001)

4.2 Reporting Methods

The KirK team will develop comprehensive reports including all data and information outlined in the 23 service areas solicited in this proposal. For this contact, deliverables generally include historic information, natural resource / water quality / watershed data, electronic files, figures, maps, tables, and the text all combined into reports that house all of these components. High quality reports are critical to getting buy-in and support from agency representatives, affiliate agencies (e.g., federal agencies), and also the public for subsequent finalizing of the water quality restoration plans.

KirK Environmental, LLC has provided DEQ on a number of watershed assessment reports related to the TMDL program. Example reports on file at DEQ include the East Valley Watershed Report and Water Quality Restoration Plan, Beaverhead Watershed Phase I Report, and Gold Creek Phase I Report. Other recent reports provided DEQ include the Ruby Valley Groundwater Management Plan (currently draft in care of Darrin Kron). These reports are cited as examples for how the KirK team will organize reports and ensure high quality deliverables.

The Kirk team understands that the reporting format in the TMDL program is an evolving process and that new direction may be forthcoming for how to best structure key technical elements, support impairment issues, and explain complex water quality issues to the general public. KirK team welcomes new approach as they are developed and will work with DEQ on providing them with the "latest and greatest" report / water quality restoration plan content and format.

Other reporting may also be required in the form of technical manuals, circulars, pamphlets, and other outreach type documents. The KirK team will work closely with MDEQ and other contract end users to provide these deliverables in format they are satisfied with meets their objective.

In summary, the KirK team is committed to high quality reports that incorporate written, tabulated, and color graphic displays, as well as electronic deliverables with all project monitoring data in the DEQ EDD SIM compatible format. The team can develop a table of contents based on a DEQ directive or propose an alternative format if requested.